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Partial Antigen Treatment of Tuberculosis.—In one year 141 cases were treated with partial antigens. A negative result was obtained in 43.2 per cent and a positive in 56.7 per cent. Such statistics are, however, warned against. Theoretically, as well as practically, they indicate a slight stride forward in the combat of tuberculosis, even though they do not fulfill original expectations.—*Erfahrungen in Tuberkulosetherapie mit Partialantigenen nach Deycke-Much, Brinkenann and Schmoeger, Beitr. z. Klin. d. Tuberk., November 12, 1921, xlix, 153.*

Biological Principles of Sunlight Treatment.—Systematic solar radiations should be carried out in every large sanatorium for surgical tuberculosis. The action of artificial sources of light are thus far not clearly understood. The action of sunlight, as explained by Kisch, as chiefly due to the hyperemia, is frequently disputed. The effect of the quartz lamp is doubtless overestimated and similar action can undoubtedly be obtained at a much lower cost with a carbon arc lamp.—*Die biologischen Grundlagen der Sonnenbehandlung, G. Wittek, 16 Kongr. der Deutsch orthop. Gesellsch., Berlin, June 20, 1921, 18.*

Sunlight Treatment of Surgical Tuberculosis.—Four years of experience in Constantinople has convinced the author of the value of sunlight treatment, particularly in cervical and mesenteric lymphatic tuberculosis as well as in peritonitis. On the contrary, bone and joint tuberculosis was not helped; however, these patients were mostly adults and for the most part in very poor general condition. The sun is not a cure but merely an adjuvant in the treatment of disease. Much more important are good nutrition, rest, iodoform in glycerin, hyperemia, X-rays and operation, but in combination with these sunlight is a great aid.—*Uber die Sonnenbehandlung der chirurgischen Tuberkulose, A. Brüning, Deutsch. med. Wchnschr., 1920, no. i, 72.*

Sunlight Treatment of So Called Surgical Tuberculosis with Special Reference to the Results at Hohenlychen.—A visit to this sanatorium offered the writer an opportunity to observe the methods in the treatment of surgical tuberculosis and to analyze the unusual results obtained. The red and infrared rays (those that produce heat), which in sunlight treatment set up such a marked cutaneous hyperemia and appear to be most active in this therapy, are particularly emphasized, in fact more so than the violet and ultraviolet rays. Therefore, at Hohenlychen the warm rays are employed, together with Bier's hyperemia and the administration of sodium iodide. The latter are merely adjuvants to sunlight treatment. Whereas formerly it was considered necessary to carry out such exposures in the highlands, it is now possible to substitute artificial sources of light even in the winter, so that this therapy is quite possible in the lowlands. Kisch has constructed special lights for the production of marked heat. A description is offered of the institute at Hohenlychen and the systematic method of carrying out the cure. The author recommends the building of a similar institute in Finland for bone and joint tuberculosis.—*Über Sonnenbehandlung der sog. chirurgischen Tuberkulose mit besonderer Berücksichtigung des Verfahrens in Hohenlychen, A. Krogius, Finska lakaresallskepets Handlingar, 1921, lxiii, 385.*

Ultraviolet Ray Treatment of Tuberculosis.—Pulmonary tuberculosis was treated with ultraviolet radiation and excellent results were obtained. Fever, cough expectoration and night sweats disappeared, and in otherwise progressive cases fibrosis resulted. The general condition was bettered, and appetite, strength and sleep were much improved. With the treatment of laryngeal tuberculosis ultraviolet radiation is a type of therapy which can hardly be surpassed. In 17 cases, 13 were healed. The exposures are practically harmless and can be carried out in any institution. They should be certainly given a trial in almost any case of tuberculosis.—*Le Applicazioni dei raggi ultravioletti nelle affezioni degli apparatic respiratorio e circolatorio, L. G. Scarpa, Morgagni, 1921, no. 10, 305.*

Treatment of Lupus with General Carbon Arc Light Baths.—This is a particularly useful remedy for lupus of the skin, although it is advisable to employ the Finsen light in addition as a local measure. The writer has studied 75 specimens from 30 patients histologically. The number of specimens varied from one to eight in the same patient, and the size of the area of disease very often determined the amount of healing. In very slight affections the epithelioid cells gradually lost their staining power and were broken up, while the round cell reaction was only rarely stimulated. In larger areas the epithelioid cells at times also lost their staining properties and were gradually destroyed, but a more conspicuous feature was the marked increase of round cells in the epithelioid structure itself, just as one sees in a marked connective tissue reaction, with many young cells which are later given off from a young connective tissue area rich in nuclei, in which there are single giant cells and round cells scattered here and there. The author believes that the changes mentioned are secondary to the dissolution process which takes place inside the epithelioid cells.—*Lupus mit universellen Kohlenbogenlichtbädern als einziger Therapie behandelt. Eine klinische und histo logische Untersuchung, K. Heiberg and C. With, Festschr. z. 25 Jähr. Jubild., Finsenschen Med. Lichtinst., Kopenhagen, 1921.*

Treatment of Laryngeal Tuberculosis with Carbon Arc Light.—Best results in laryngeal tuberculosis are obtained by surgery, which cannot be carried out in all cases. Treatment with general radiation of the body by the carbon-arc has given excellent results. Most cases are at least bettered and some heal completely. Other methods can be carried out simultaneously with the lamp exposures. It is not completely understood how light acts. The suggestion of its effect upon the endocrine system and blood serum is offered.—*Behandlung der Kehlkopftuberkulose mit Kohlenbogenlampenlicht, E. Pollatschek, Ungar. Tuberkulosekongr, September, 1921.*

Effect of Carbon Arc Radiation on Blood Pressure.—After twenty to forty minutes of continuous radiation with a carbon arc light of 20 to 40 amperes at a distance of 0.5 to 1.5 metres, there was a drop in blood pressure of 10 to 20 mm Hg., in addition to subjective disturbance. This occurred only if patients inhaled the air that had been subjected to the products of combustion as a result of the burning of the lamp; however, if the latter were eliminated by some means of masking so that the patient inhaled only foreign air, the blood pressure did not drop. In some cases there was a drop in pressure of 40 mm. However, in instances of high pressure, namely of 200 mm., there was often very little change in the condition.—*Verhalten des Bluldruckes nach Bogenlampenlicht-Bestrahlung, A. Kimmerle, Münch. med. Wchnschr., 1921, no. 42, 1359.*

X-ray and Radium Therapy.—This is a review of a large number of new publications on X-ray and radium therapy. It points out that in bone, joint and lymphatic tuberculosis, as well as in leukemia and uterine disturbances, excellent results have been obtained. On the other hand, in a larger group of diseases, and particularly in cancer, the problem is far from solved and requires much more extensive experimentation.—*Neue Ergebnisse der Strahlentherapie, A. Püschel, Forstschr. d. Med., 1921, no. 27, 933.*

Treatment of Cervical Lymphatic Tuberculosis by X-ray.—In the Breslau Sanatorium, tuberculous cervical nodes were always rayed except when patients demanded operation. Only in 1.8 per cent of cases did they fail to respond to exposures. When operation was performed, it was only on the small nodes which were excised without difficulty. Seven to nine exposures were generally carried out before one considered final excision. The results were such as to make X-ray exposure the treatment of choice.—*Beitrag zur Röntgenbestrahlung tuberkulöser Halslymphdrüsen, G. Kneir, Berl. klin. Wchnschr., May 24, 1920.*

Sensitization in X-Ray Therapy.—Ten per cent potassium iodide solution was used to sensitize tuberculous lymph nodes before X-ray treatment. Controls were exposed without sensitization and all radiated

at the same time and for the same period. All nodes healed similarly. The author therefore cannot particularly recommend this method of treatment, as has been advocated by Rohror.—*Zur Frage der Sensibilisierung in der Strahlentherapie, K. Lenk, Deutsch. med. Wchnschr., 1920, no. 1 75.*

Deep X-Ray Treatment of Genital Tuberculosis.—Observations upon 24 cases for a period of eight years bring the writer to the conclusion that roentgen therapy is particularly valuable for testicular tuberculosis. This conclusion is reached after a rather detailed comparison with surgical as well as other conservative measures. The radiations should be carried out with small doses frequently employed and properly spaced.—*Zur Röntgentiefendestrahlung der Genital-Tuberkulose, K. Ullmann, Wien. klin. Wchnschr., 1921, no. 46, 559.*

Combined Treatment of Lymphatic Tuberculosis with Krysolgan and X-Rays.—Twenty-one patients, most of them with lymphatic but some with pulmonary tuberculosis, were treated with krysolgan alone or in combination with sunlight and X-ray. The combined method seemed to give better results than tuberculin therapy. In hilum and apical tuberculosis gold treatment is highly recommended. Harm was noted only in one case in which an eczema with fever appeared as a result of gold poisoning.—*Über kombinierte Gold- und Strahlenbehandlung bei Drüsentuberkulose, C. Ülrichs, Deutsch. med. Wchnschr. 1920, no. 1, 78.*

X-Ray Treatment of Tuberculous Peritonitis.—As a result of the use of X-ray treatment in 12 cases of peritoneal tuberculosis, X-ray treatment produced a remarkable improvement and it is therefore recommended as the best method of treatment.—*On Roentgen Ray Treatment of Peritoneal Tuberculosis, Tozo Umeda (Tokyo Iji Shinshi, October, 1921, no. 2248), Abstract from Japan Medical World, February, 1922, ii, 44.*

Radiotherapy of Blood-Forming Organs in Pulmonary Tuberculosis.—Attempt was made to influence pulmonary tuberculosis by stimulating the blood defenses by radiotherapeutic applications in small doses to the different hematopoietic organs, such as the spleen, medulla of the sternum and long bones. Twenty-three patients were treated, of whom 16 were given over ten exposures. All the patients had advanced tuberculosis, the greater part with cavitation. All were clearly benefited to a considerable degree. Improvement in general condition, stabilization of temperature, cessation of night sweats and cough were noted. The red blood cells, at first deficient, soon returned to normal or surpassed it; with regard to the leucocytes, there occurred first a phase of leucopenia, followed by a hyperleucocytosis. After the seventh or eighth treatment the tubercle bacillus in most cases underwent a morphological change; it became elongated, curved or segmented and usually showed numerous granulations; following this regressive stage, in two cases, there was complete disappearance of the bacilli.—*Traitment de la tuberculose pulmonaire par la radiothérapie des organes hématopoiétiques, F. Trémolieres and P. Colombier, Meeting Académie de Médicine, February 14, 1922, reported in Le Prog. Méd., February 18, 1922, no. 7, p. 83.*

Influence of X-rays on Morphology of Blood.—Fifty cases of radiated tumors of the uterus were studied for blood changes. In early cases there was a diminution of the erythrocytes and hemoglobin, but never an increase of the former. The drop occurred three days after radiation, averaging 5 to 12 per cent. On the seventh day there is a return to normal. In severe cases, with a previous loss of red blood cells and hemoglobin, there is little tendency to recover. If the hemoglobin in such cases were only 15 per cent under normal, there was a drop every three to six days of 25 or 30 per cent and in rare cases of 40 per cent. These did not return to normal. Morphological changes of the red blood cells were never found. The leucocyte changes agree with the observations of others. Neutrophilic leucocytosis was observed only for a few hours after radiation. Following this, there was always an absolute drop of the leucocytes and lymphocytes. This lymphopenia reached 3 to 4 per cent in certain cases and always accompanied a drop in the large mononuclear cells. Gradual disappearance of the eosinophiles in patients who are approaching cachexia is considered a bad prognostic sign, whereas increasing eosinophiles are considered favorable. After complete disappearance of the eosinophiles there is never a return to good general condition. If there is a normal or increased eosinophile count the prognosis is always favorable. Therefore, it can be expected that, if a tumor is favorably influenced, there is a rapid return to the normal blood picture, whereas if it is not hindered in its growth there are conspicuous blood changes.—*Influenza della Röntgenterapia sulla composizione morfologica del Gangue, N. Masieri, Gazz. d. Osp. e. d. C in. 1921, no. 81, 962.*

Immediate Effects of X-rays on Lymphocytes.—In 10 rats after twelve seconds of radiation, there was a drop in the lymphocytes of about 50 per cent, whereas in similarly treated animals protected by lead there was an increase of the lymphocytes; in one case even up to 40 per cent. This work was carried out to study the question of whether the drop of lymphocytes in the blood after general X-ray exposures was due to direct action or to a nervous reaction. The results indicate that the action is a direct one and that there is a quantitative relationship between the period of exposure and the time of the radiation. Variations in the blood picture will take place in twenty-four hours after a twelve second exposure and in from two to three weeks after a thirty minute exposure.—*The Immediate Effects of X-rays on the Blood Lymphocytes, S. Russ, Arch. Radiol. & Electrotherap., 1921, xxvi, 146.*

Analysis of Sanatorium and Hospital Discharges.—Inquiry among English sanatoria brings out the fact that from 12 to 56.5 per cent of the patients are discharged for other than medical reasons. This report deals with 3,494 discharges from sanatoria and hospitals to which the West Riding County Council send patients. The period covered is from January 1, 1918, to October 19, 1921. Of these cases 2,396 were adult males, 809 adult females, 168 boys and 121 girls. Of all discharges, 1,918 or 54.8 per cent were considered regular and there were 208 deaths (5.9 per cent). The total number of irregular discharges was 1,368 or 39.1 per cent of all discharged. For disobedience of rules such as exceeding exercise limits and overstaying leave, 329 were discharged (309 males, 17 females and three boys); ex-service men made up 83.4 per cent of this group. Eighty-one patients or 5.8 per cent of the group discharged themselves because of their "hopeless condition" or because they felt that further improvement was improbable. In 369 cases no reason was given for leaving. Domestic and economic reasons were given in 287cases or 20.9 per cent; 247 of these were because of financial difficulties and this emphasizes the need of considering the family as a whole when a plan of treatment is mapped out. The rest left for various reasons, such as homesickness, temperamental difficulties, severe climatic conditions, etc. Of 59 children irregularly discharged 35 were removed by parents for sentimental reasons. Eighty-seven patients were transferred for other forms of treatment. In any effort to appraise the true value of sanatorium treatment, irregular discharges should not be included.—*An Analysis of Sanatorium and Hospital Discharges, J. B. McDougall, Tubercle, July, 1922, iii, 440.*

Location of Lesions and Its Influence on the Prognosis of Pulmonary Tuberculosis.—In a study of 1048 cases of pulmonary tuberculosis, it was found that in advanced disease the prognosis is less favorable with left than with right-sided lesions. This is presumably explained by the fact that there is only one interlobar fissure to hinder the extension of lesions on the left whereas there are two on the right. *Summary and conclusions:* 1. In early tuberculosis the right lung is affected twice as often as the left. 2. As the disease progresses there is a marked increase in the number of involvements of the left lung, so that in the advanced stage of the disease the right and the left lungs are numerically equally involved. 3. Patients with a predominating left lung involvement are liable to run an active course more often than those with preponderating right side lesions. 4. In early phthisis the side of the lung involved has no definite relation to the general prognosis. 5. In advanced phthisis the prognosis is distinctly less favorable in those with preponderating lesions of the left lung. 6. The presence of but one interlobar fissure, moderate atelectasis and the evil effects of sinistracardia and retraction of the stomach are factors which contribute toward the greater gravity of left lung lesions as compared to the right.—*Comparative Prognosis in Tuberculous Lesions of the Right and Left Lung, A Study of 1048 Cases, B. P. Stivelman and N. C. Miller, Amer. J. M. Sci., July, 1922, clxiv, 82.*

Tuberculosis among Ex-Service Men.—In 1919 it was estimated by the U. S. Public Health Service that approximately 12,000 beds would be required within two years for tuberculous veterans. By the end of April, 1922, there were 11,346 tuberculous veterans in government hospitals besides others receiving compensation for that disability who declined hospital care. There was only a slight increase in the incidence of the disease in the United States during the war. In 1916 and 1917 there was a perceptible rise, referable to increased living costs, and in 1918 a greater rise due to the epidemic of influenza. There seems little doubt that these increases were not related to actual participation in the war. The comparative rates of 1915 and 1920 show a marked postwar decline in tuberculosis mortality, greater among males, including those of military age, than among females. The War Risk Insurance Act of October 6, 1917, promised hospital care to disabled veterans,

but made no provisions for the construction or operation of hospitals, nor did it name the agency whereby the proposed care was to be provided. It was not until March 3, 1919, that Congress named the Public Health Service as the principal agency whereby hospital and medical care was to be provided. The idea prevailed that permanent hospitals are not necessary for the treatment of tuberculosis and it was necessary to explain again and again that a tuberculous patient needs highly specialized care, calling for modern hospital facilities. In the emergency it was necessary to find contract hospitals and these institutions were representative of the medical care prevailing in the respective communities at the time. Some of the institutions were excellent; others were later abandoned as unsuitable. At this time there was some sentiment in favor of having the patients cared for in state or other public sanatoria, but there was a marked feeling against the admission of veterans to any hospitals which cared for free patients. There appeared, therefore, no choice but to proceed with the development of temporary hospitals, for which some funds were provided, but which, according to the law, could not be used for permanent construction, since the temporary army hospitals were usually unfitted. Ten army hospitals were taken over and two other supplementary hospitals were established. From the beginning of the work of the Public Health Service, the hospitalization and the transfer of patients were, so far as possible, decentralized. According to a custom that has prevailed in the service for more than a hundred years, tuberculous patients were routinely admitted as a temporary measure to any of its general medical and surgical hospitals. At times the patients could not be convinced that a climatic change is unnecessary in the modern scheme of treatment, but all were provided with or offered hospital care without delay. The hospitals were manned almost exclusively by personnel from the military and naval forces. Special courses of training for medical officers were provided. Up to May, 1922, approximately 65,000 veterans were admitted to hospitals. While final statistics have not been published, the general impression prevails that war gases were not an important cause of clinical tuberculosis. The restless mental attitude of patients is indicated in some measure by the fact that out of 9,200 patients discharged from service hospitals between July 1, 1921, and May 1, 1922, 3,132 left against advice and without permission; 189 were discharged for disciplinary reasons. The work of the hospitals included artificial pneumothorax, heliotherapy, occupational therapy, vocational training, treatment of laryngitis by silence and sunlight, and investigation of small pneumothorax. Approximately 3 per cent of the patients admitted to the hospitals had nonpulmonary disease; of these, approximately two-thirds had bone and joint involvement. Approximately one-third of all veteran hospital patients are the tuberculous. The field organization perfected for this work by the Public Health Service together with the contract hospitals was turned over to the U. S. Veteran's Bureau in June, 1921; the veterans' hospitals were transferred, May 29, 1922. This transfer consisted of 57 hospitals, with 17,500 beds, 13,057 patients (of whom 5,271 were tuberculous) and a personnel of 11,349, including 924 physicians and dentists, 1,425 nurses, 425 reconstruction aides, and 110 dietitians.—*Tuberculosis Among the Ex-Service Men, with Special Reference to Its Bearing on Public Health, H. S. Cumming, J. Am. M. Ass., July 29, 1922, lxxix, 370.*

Tuberculosis Mortality among Females.—The difference in death rate from tuberculosis between women and men is not a universal, fixed quantity, but a figure which varies in different countries, at different times and under different conditions. The fall in the death rate from tuberculosis in recent times has been relatively greater for men than for women; the mortality among women has in consequence become equal to or even greater than the mortality among men in certain groups, national or economic. The relative increase in the death rate among women coincides with the relative increase of women in industry. Increased toil determines increased liability to tuberculosis both for men and women. That work *per se* is a factor, and that factory conditions are not exclusively implicated are manifested by the effect of agricultural work. Where women have taken over the tillage of the soil, abandoned by the male population for industrial work, tuberculosis among the women has increased to a point which brings their death rate nearly to that of men. In the country, where women are, as a rule, more laboriously employed than the women of the towns, the death rate is higher.—*La mortalité tuberculeuse du sexe féminine, E. Arnould, Rev. d. l. Tuberc., 1922, iii, no. 2, 141.*

Atypical Cases of Pulmonary Tuberculosis.—In patients with pulmonary tuberculosis of identical pathological forms, the disease often exhibits strikingly different modes of development. In the sanatorium of Buysinghen at Brussels observations have been made which illustrate the extreme variation from type presented in two common

varieties of pulmonary tuberculosis, namely, fibrocaseous and fibrous phthisis. In a number of cases patients apparently well and strong, sometimes exceptionally active, with normal weight and temperature, are suddenly attacked with hemorrhages and upon examination show extensive lesions with cavity, often involving large portions of one or both lungs. Sometimes there is a history of slight cough, of occasional hemorrhages extending over a long period of time. Such patients may respond to sanatorium treatment by gain in weight without the slightest improvement in the lungs. On the contrary, extension of the lesions may be rapid and marked. Fibrocaseous tuberculosis of the lungs may therefore exist for long periods and develop so far as to form cavities without betraying its presence, either by objective or subjective symptoms. Other patients with minimal fibrous lesions, completely arrested from a pathological point of view, manifest, over long years, a variety of functional troubles, such as fever, pain, digestive disturbances and underweight. Sanatorium treatment, with rest in bed, may at times lead to some gain in weight; otherwise, the symptoms remain unmodified. Prolonged observation of many such cases warrants the belief that fibrous cicatrization is not always identical with a cure; that tuberculous patients, declared cured and really cured in a pathological sense, are, in a social sense, actual derelicts. How are these two clinical types to be explained? In one type certain subjects acquire progressive caseous lesions without toxic symptoms of a general nature, or at least with extremely attenuated toxic symptoms; another type with stationary fibrous lesions exhibits prolonged general symptoms of toxemia. Can these peculiarities be attributed to different characteristics of the infecting germs? Nothing appears to warrant this supposition. If an explanation is sought in the character of the patient's reactions, we may suppose that persons show selective differences in their sensitiveness to toxins of the tubercle bacillus, being immune or relatively immune to some toxins and unresistant or only slightly resistant to others. Patients of the first sort would be sensitive to toxins which determine caseation, and resistant to toxins which cause fever, sweating, pain, cachexia, etc. Patients of the second sort would be immune to caseifying toxins and sensitive to toxins which produce fever and other functional troubles.—*Formes évolutives anormales de la tuberculose pulmonaire, Geeraert, Rev. d. l. Tuberc., 1922, iii, no. 2, 131.*

Minimal Period of Exposure for Tuberculosis.—In seven collected cases of tuberculosis in children the evidence favors the view that the tuberculosis was acquired after a very short period of exposure, namely, one to thirteen days. The contacts were for the most part direct ones, nursing, feeding, handling; in one case there seems to have been no direct contact. In an eighth case, one of reinfection, the period of exposure was thirteen days.—*La durée minima de la période infectante dans la contagion humain par le bacille de Koch, C. Souleyre, Presse Méd., April 1, 1922, xxx, 279.*

Contamination of Mouth and Table Utensils by Tubercle Bacilli.—The mouths of twenty patients with sputum positive for tubercle bacilli were washed with 50 cc. of sterile water and enough antiformin added to make it 0.5 per cent solution. The centrifugated portions were injected into guinea pigs. The washings from spoons, pillow cases, forks and cups were also injected. The ward crockery was placed in a large open sink, filled with water, and allowed to stand for a few minutes. A sample of the deposit was then withdrawn for examination. Live steam was next bubbled through the water for an hour and a second specimen withdrawn and examined. *Conclusions:* 1. Fifty per cent of phthisis patients with tubercle bacilli in their sputum were found to have virulent tubercle bacilli in their mouths. The group with profuse expectoration yielded a larger percentage of positive results (80 per cent) than the group with scanty expectoration (20 per cent). 2. Sixty per cent of the group with profuse expectoration were found also to contaminate the spoons used, whereas none of the group with scanty expectoration did so. Other table utensils were not found to be contaminated. Probably the spoons were more easily contaminated because a larger surface of the utensil was exposed to the buccal mucous membrane than was the case when the other utensils were used. 3. Plain water, if used in sufficient quantity, appears to be a satisfactory sterilizing agent. Live steam, as used in ward kitchens, makes this sterilization doubly sure.—*Buccal Infection with B. Tuberculosis, S. R. Gloyne, Tubercle, August, 1922, iii, 497.*

Experimental Reactions in Lung.—Experimentally, the lung may be entered from without, via the air passages, or from within, by the blood stream. This study is on the comparative effects of different oily solutions introduced in these two ways. The substances were simple purified oil, the same oil plus tubercle bacillus waxes, codliver oil, vaseline, and chicken red blood cells. By the intratracheal method,

there was produced a reaction of the alveolar cells, and thus it was possible to determine precisely the origin of the so called dust cells. On injection of the oil there is first seen a swelling of the cells lying superficially; they become swollen, project into the alveolus, and then break loose and become the free-lying spherical cells which are nothing more nor less than the dust cells. The distinction between epithelial and epithelioid cells is a matter of their location, the epithelial cell being in the alveolus, the epithelioid in the parenchyma. The epithelial cells on thus breaking loose do not die; instead, they multiply and may do this so very rapidly as to approximately resemble tuberculous giant cells, but always isolated. Once free, these cells become phagocytes and are found engorged with carmine if the latter be applied. They may be followed in the adventitia of the bronchi, where in man are found quantities of carbon. Again the multiplication of these cells may be such that the alveoli are choked with them, to the extent even of resembling an epithelial neoplasm. This is particularly noticeable in lungs subjected to asphyxiating gases. This catarrhal alveolitis is rarely pure in character; usually, there is an accompanying hyperplasia of the alveolar framework. When, on the other hand, the lesions are provoked by the intravenous route, purely parenchymatous reactions are obtained, which take place without the concurrence of the epithelial cell. Injection of simple oil does not cause a serious reaction. On the contrary, oils containing tubercle bacillus wax, codliver oil or chicken red blood cells cause new growths, which structurally resemble the classical tubercle, and which develop in the wall of the alveolus, even to the point of effacing the latter. The beginning of the reaction is characterized by a great number of polymorphonuclear leucocytes which later give way to eosinophiles; the latter are believed to be derived from the polynuclear leucocytes. The lymphatic tissue of the lung is believed to furnish the cell elements of the tubercles thus artifically produced from within. The most interesting cell is the epithelioid. At times, it shows several nuclei, and evolves into the giant cell which is only a special form of the epithelioid cell. It is found then that if the attack on the lung is from without it is met by the epithelial cells and if from within by lymphoid cells, including eosinophiles.—*Recherches sur quelques réactions expérimentales du poumon, A. Guieysse-Pellissier, Ann. d. Méd., June, 1922, xi, no. 6, 495.*

Microörganisms in Lungs of Normal Laboratory Animals.—It was known that the larger herbivora harbored organisms in the lungs, but as some doubt existed as to the same occurrence in laboratory animals the following experiments and observations were made. Under aseptic conditions small pieces from the borders of the lungs of normal animals were removed and placed upon culture media. Slanted plain agar, agar to which a few drops of defibrinated horse blood were added, and veal infusion bouillon were the media used. The bits of tissue were pushed down over the surface of the slants into the condensation fluid and all tubes were incubated at 38°C. Tubes incubated with lung tissue from calves, rabbits and guinea pigs showed a large number of positive results; those from white mice and white rats a much smaller number. Streptothrix, bacillus subtilis, and moulds were in greatest numbers. Practically all the forms met were spore bearers. They probably originated in the hay and straw and were taken into the respiratory tract. This would account for the larger proportion in the herbivorous animals and the small number in rats and mice. To establish this hypothesis, a series of experiments was undertaken. Twenty-nine per cent of rabbits, fed washed hay and oats, gave positive tubes. Ninety per cent of rabbits, fed in the usual manner, gave positive tubes. Twenty-six per cent of guinea pigs, fed grass or cabbage, gave positive tubes. Eighty-nine per cent of guinea pigs, fed the same with hay, gave positive tubes. Forty-nine per cent of mice, kept under normal conditions, gave positive tubes. Eighty per cent of mice having straw as litter gave positive results. Five per cent of mice in dust-free conditions gave positive results. The general character of the streptothrix from the lungs resembled those obtained from the hay and straw. The bronchial lymph nodes of all guinea pigs examined developed, in sixty-six per cent of the tubes, microorganisms similar to those obtained from the lungs. The observations have some practical bearing for those interested in the study of respiratory disease, especially in species like the rabbit and guinea pig. By withholding spore-bearing substances, such as hay and straw, it is possible to cut down the number of contaminating microorganisms. This is of considerable value when small, oftentimes indistinct foci of consolidation are met with.—*Microörganisms in Lungs of Normal Animals, F. S. Jones, J. Exp. Med., September, 1922, xxxvi, 317.*

Nutrition and Growth in Relation to Tuberculosis.—The statement that almost every child is infected by tuberculosis before the age of 18 ought to be accompanied by a further statement as to the effect of lowered nutrition in making active a dormant process.

Parents must be made to understand the nutritional condition of their children and how to keep them up to a normal standard of health. Through the nutrition class a well tested program, based on careful clinical studies, is applied to the problem. This program should be so planned that the underweight children will continue their effort until they have gained weight in proportion to their height, and have been trained in food and health habits. The weight-for-height standard has been adopted after long-continued clinical experience as the best single test of nutritional condition, although a "safety zone" has been worked out running from 7 per cent under to 20 per cent above the average weight, to allow for variations in type and build. Most of the causes of malnutrition come under one of the following heads: physical defects; lack of home control; overfatigue; faulty food habits, with improper and insufficient food; faulty health habits. To overcome these causes coöperation must be effected between the four forces which bear an essential relation to the child's health—the home, medical care, the school and other social agencies, and the child's own interest. The first step in the program is to seek the coöperation of the parents. They should be present at the physical growth examination of the child, and their help is needed in the case history and social examination which follows. If a mental examination is added they should be informed of the results. The presence of the mothers is urged at the weekly meetings of the nutrition class, where they receive the instruction needed in each particular case. The first of the five causes of malnutrition is especially evident in groups of "contact" cases. Diseased adenoids and tonsils are particularly common in this group. In no other group do we find more serious disintegration of the home. In families of this class we are often surprised at the failure of those who had them in charge to give training in the essentials of health. Cases of overfatigue among children exposed to tuberculosis are numerous. There is generally a failure to recognize that such children are unequal to the demands of a full school program. With regard to the child's own interest, encouragement is needed. The child who is sent to a tuberculosis clinic is stigmatized by his companions as a "hip" case, whereas no such stigma attaches to the nutrition clinic or class. Nowhere has our nutrition program been more effectively demonstrated than in the work of the local association of Rochester and Monroe County, New York. Here the beginning made with children of school and preschool age naturally extended to the young people entering industry. This is a period of life of great strain, when advice and counsel in the matter of health are important. The nutrition program should eventually come under the board of education when the public is ready to support the new measures. Up to the present, the teaching of nutrition and growth in medical schools has made little progress, but eventually their importance will be recognized. It is not enough to determine whether a child is sick, but also whether he is growing properly. Back of the clinic, the school, the industrial centre, the summer camp, the preventorium, the sanatorium, must be home coöperation. When the child is made well in his own home, both mother and child learn the essentials of health, and through this education the reconstruction of the home is accomplished.—*Nutrition and Growth in Relation to Tuberculosis, W. R. P. Emerson, Boston M. & S. J., October 5, 1922, clxxxvii, 495.*

Functions and Integration of Intercostal Muscles.—Galen believed the external intercostals to be expiratory and the internal inspiratory, and this teaching was accepted until Vesalius, thirteen hundred years later, interpreted both groups as having the same function. In 1673, Willis interpreted the external muscles as inspiratory and the internal as purely expiratory. In 1748, Hamberger devised his famous model and the theory which has been quoted in all subsequent physiological literature on the subject. The only experimental confirmation of this theory worth considering is Martin and Hartwell's, published in 1879. They observed the internal intercostal muscles attached to a pair of isolated ribs to contract during expiration only, but failed to prove that these muscles are never inspiratory or the external intercostals never expiratory. Nor did they consider the integration of all respiratory muscles in the normal animal. The experimental work and observations which are here cited lead to the conclusion (1) that the external intercostal muscles are employed in inspiration in all respiratory conditions, also, under certain conditions in expiration, when activated synergically with the abdominal muscles; (2) that the internal intercostals are employed in expiration in hyperpnea, and in inspiration when hyperpnea is combined with resistance to entrance of air. A case is cited of a man who had lost all use of the intercostal muscles through poliomyelitis, except those going to the four lowest ribs on the right side, also the *triangularis sterni* and *serrati postici*. His vital capacity was reduced only 15 per cent below normal, but he could not expel air explosively, as by a cough

or sneeze, unless the sides of his thorax were supported, and his capacity to inspire and expire against resistance was only about half normal. Thus, although ordinarily in a state of respiratory comfort, his intrapulmonic pressure could be raised only half as high as normally possible. On the left side, where all the intercostals were paralyzed, there was a perceptible widening of the intercostal spaces and a tautening of the intercostal structures on strong inspiratory effort; and the entire left thoracic wall was perceptibly elongated, together with an increase in circumference of the upper three-quarters of the thorax accomplished by the *scaleni*. Careful observation and experimental work on dogs have been carried out to determine the following points: 1. The contribution of each group of muscles to vital capacity. The foregoing observations showed that elimination of the intercostals reduced the vital capacity by only 15 per cent. Paralysis of the diaphragm, by section of the phrenic nerve, reduced it about 50 per cent; paralysis of both intercostal and abdominal muscles by somewhat more than this. With both diaphragm and abdominal muscles eliminated, the vital capacity was about one-third normal. 2. Conformation and movement of the bony thorax. The bony thoracic cage consists of two parts, the upper portion or cuirass, consisting of the sternum and upper five ribs, whose lateral portions rotate in a vertical plane and whose radii of rotation increase in length from above downward, and the lower or bellows portion. In the upper portion of the chest, elevation of a pair of ribs in parallel relation narrows the intercostal space, the reverse of conditions below. If figures are constructed to represent these two portions, using crossbars of the proper relative length for ribs, the effect on the intercostal spaces on raising or lowering the ribs can be readily seen. In a normal person, with quiet breathing, the manubrium and first pair of ribs are anchored by the *scaleni;* they move cephalad in forced inspiration. When the *scaleni* are paralyzed, the manubrium and first three ribs move caudad on inspiration, the fourth rib is stationary, but below that there is exaggerated movement in a normal direction. In normal quiet breathing, the first rib is not elevated and below the second there is no demonstrable variation in the breadth of the intercostal spaces. The distance between two selected points on the second and tenth ribs is unchanged within the range from apnea to maximum inspiration; but in normal tranquil breathing the distance between selected points on the clavicle and tenth rib is diminished. Normally the sternum on inspiration is rotated anteriorly on a transverse axis at the upper border of the manubrium, and its lower end retracted when the action of the subcardial diaphragm overcomes that of the intercostals. In the excursion of the thorax from the position of rest to that of extreme expiratory compression, the upper part of the chest, or cuirass, and the lower or bellows part are both diminished in circumference, the upper interspaces slightly broadened and the lower narrowed. 3. Function of the intercostal muscles and their integration in respiratory action. These are in part deduced from the foregoing and in part from further observations. Direct action of the intercostal muscles cannot widen the intercostal spaces. They simply elevate the ribs and assist rotation. In dogs, if the abdominal muscles are eliminated, the intercostals can raise the pressure in the pleural cavity. These observations conflict with the prevailing point of view, which assigns to the intercostal muscles, as their chief function, the fixation of the side of the thorax and intercostal spaces. Since in the case of the patient cited the ability to inspire and expire against resistance were equally affected, the intercostal muscles must play an equal rôle in forced inspiration and expiration. It is also evident that shortening of these muscles is not essential to their employment. Thus far the only demonstrated intrinsic effect of intercostal action is to narrow all the interspaces, but this in itself accomplishes no respiratory end. To accomplish a definite respiratory effect, the intercostals must work in harmony with other muscles. This can be shown in experimental animals, and we have the evidences of disharmony where an important group, such as the scaleni, is paralyzed and defective aeration of the upper thorax results. Normally expiration is a passive act and none of the intercostals are employed; but during forced expiration the internal intercostals are bought into play before the abdominal muscles; when the latter are brought into play, the external intercostals are synergically activated; in inspiration they are constantly activated. During inspiration the *scaleni* and *serrati postici superior* supply the necessary cephalad anchorage, while in active expiration the caudad anchorage, eliminating the abdominal muscles, is supplied by the *serratus posticus inferior*, and caudad traction for the cuirass by the *triangularis sterni*. Thus, as Vesalius said nearly four hundred years ago, the action of the intercostal muscles is the same in inspiration and expiration; but they aid expansion or contraction of the thorax, it may be added, according to the gradient determined by the synchronous activation of other muscles.—*The Functions and Integration of the Intercostal Muscles, C. F. Hoover, Arch. Int. Med., July 15, 1922, xxx, 1.*

Method for Measuring Pressure in Pulmonary Artery.—A new cannula was devised to meet the requirements of experiments in the laboratory. By this method the heart and great vessels are exposed, but the lungs are closed in the pleural cavity by sewing the edges of the pericardium to the opening in the anterior wall of the chest. Animals so prepared are able to breathe normally. Cannulation of the pulmonary artery must be attained without circulatory embarrassment and without diminishing the size of the capillary bed of the lungs. The cannula used must be simple of insertion and so constructed as to permit use over long periods of time without danger from blood clotting. Diagrams of the instrument are attached and full instructions for its use. The method is so simple that it is planned to use it in class work. There are also tracings from the carotid and pulmonary arteries of a rabbit.—*A New Method of Measuring the Pressure in the Pulmonary Artery, W. E. Swift, G. E. Haggart and C. K. Drinker, J. Exp., Med. September, 1922, xxxvi, 329.*

Vital Capacity Constants in Pulmonary Tuberculosis.—The present study is an extension and summation of former studies which have been published. In this paper only definite cases of pulmonary tuberculosis are dealt with, cases in whose sputum tubercle bacilli have at some time been found; in all, 267 cases. The vital capacity is expressed in percentages above and below normal with a + or − sign affixed. Only one of the entire number showed a vital capacity above normal, and he showed no signs or symptoms of disease while under observation, although reported previously to have had a positive sputum. Tables are appended showing the recorded percentage deficit of the vital capacity as compared with the Turban-Gerhardt anatomical classification, and include the observations of Dr. Charles Cameron of Glasgow. They show that in general the vital capacity diminishes as the extent of the disease increases, but the extent of the variations shows that this is not the only factor causing diminished vital capacity. Toxemia is a more important factor, for we see the vital capacity rapidly diminishing in acute toxic cases, whereas it remains more or less constant in extensive fibroid cases. This diminution may be irregular, according to the exacerbations or remissions of the disease. As regards relation to body weight there is no reliable correlation. *Conclusion:* 1. In cases of pulmonary tuberculosis there is a definite decrease in vital capacity, but after treatment it may improve and even exceptionally return to normal. 2. Improvement in the clinical condition of the patient is accompanied by increased vital capacity, while advance in the disease results in a decrease. 3 It is possible by this means numerically to express the injury to health which otherwise would depend on individual differences of interpretation of physical signs. 4. As an aid to diagnosis, even a single, but more particularly a repeated examination of the vital capacity of doubtful cases will prove useful, though it must be borne in mind that other diseases may also cause a lowering of the vital capacity. 5. A systematic study of the vital capacity in its proper relationship to body size has given important information as to the effect of treatment.—*The Vital Capacity Constants Applied to the Study of Pulmonary Tuberculosis, G. Dreyer and L. S. T. Burrell, Lancet, August 19, 1922, cciii, 374.*

Normal Vital Capacity and Effects of Posture.—During the course of investigations on orthopnea, it was found necessary to establish some standards for normal vital capacity in the sitting and lying positions. The investigation also widened into an inquiry as to the best basis for comparison in the estimation of vital capacity. The data show that body surface, as determined by the linear formula of Du Bois, is a far more accurate and constant index of comparison than are height or weight, or certain measurements of chest volume recently advocated by Lundsgaard and Van Slyke. The observations were on 290 normal people, 144 men and 146 women, consisting of medical students and nurses, respectively, whose ages varied from 20 to 30 years. The data accumulated by West quite closely correspond to the above in the relation of vital capacity to body surface. *Conclusions:* 1. After computing the averages of all estimations on 290 normal persons, there was found 5.5 per cent less vital capacity, lying than sitting. 2. About 80 per cent breathed 6 or 7 per cent less when lying, and 20 per cent the same or more. There was no relation to chest conformation, but in every instance the obese female breathed about 15 per cent less, lying. 3. Persons of the same sex and body weight vary greatly in their vital capacity; persons of the same sex and height less; while persons of the same sex and body surface are surprisingly alike in vital capacity. Only about 8 per cent of males and 9 per cent of females, grouped according to body surface, missed their respective group average by more than minus 10 per cent. 4. From these data we can conclude that a normal male between the ages of 20 and 30 has a vital capacity of 2.5 litres per square metre of body surface; a normal female of

the same age series of 2 litres per square metre.—*The Estimation of Normal Vital Capacity with Especial Reference to the Effect of Posture, C. D. Christie and A. J. Beams, Arch. Int. Med., July 15, 1922, xxx, 34.*

Tidal Expansion of Krönig's Areas.—Krönig's areas are the areas of reflected apical resonance, each consisting of a narrow isthmus, widening anteriorly to a base extending from the inner end of the clavicle to the junction of the outer and middle thirds, and posteriorly to a base extending from near the first dorsal spine to a point opposite the junction of the middle and outer thirds of the spine of the scapula. Krönig held that disease on the median side of an apex caused "veiling" of the inner border, while central apical lesion caused contraction of both borders. According to Riviere, a normal Krönig's isthmus is 5 cm. in width, but in persons of sedentary occupation or of small size or poor development it may be 4 cm. and yet be within normal limits. He regards an isthmus of less than 3.5 cm. as always pathological and develops certain postulates in relation to pulmonary disease, some of which, however, call for modification, since disease may be present, as revealed by the ordinary method of percussion and auscultation, although the isthmus is of normal size on the diseased side. In a study of 45 cases in which the isthmus was normal, 22 were found associated with normal lungs and 23 with disease, as revealed by ordinary physical signs. In about one-third of the diseased, the opposite lung was worse; thus there may have been a compensatory hypertrophy. Of the 23 diseased apices with normal areas, 9 showed defective tidal expansion. The apices were less than normal in 79 cases; in 67 definite disease was revealed by the ordinary methods; the other 12 were apparently normal. In 52 cases where both lungs were diseased, only one isthmus was contracted in 20 cases; both in 28 cases; neither in 4 cases. The following postulates may be stated: 1. Where lung is healthy, isthmus is normal. 2. Where lung is diseased isthmus is generally contracted. 3. Where isthmus is normal lung may be healthy or diseased. 4. Where isthmus is contracted lung is generally diseased. 5. Where both lungs are normal both isthmuses are normal and equal. 6. Where both isthmuses are normal and equal both lungs are generally healthy. 7. Where both lungs are diseased both isthmuses are generally contracted. 8. Where both isthmuses are contracted both lungs are generally diseased. *Tidal percussion of Krönig's areas:* The whole area is first mapped out during quiet breathing, and then with the finger parallel to, first, the inner border and then the outer of the narrow isthmus, the deviation inward and outward of these borders on deep breathing is found; this represents the tidal expansion. The average tidal expansion in 40 normal apices was found to be for the outer border one-quarter inch; for the inner one-half inch. The difference is probably due to the anatomical shape of the lung. Diseased apices causing contraction of the isthmus are usually associated with deficient tidal expansion. The narrowed isthmus represents structural change, the deficient expansion functional deficiency. In the case of 40 normal apices (by physical signs) tidal expansion was defective in 9, while in 130 diseased apices tidal expansion was normal in 37. One would not expect an absolute correlation, because of the possible error and inaccuracy of the results of physical examination, and the possibility of the existence of healed and latent tubercle. In 56 of 170 apices examined, the isthmus was normal, yet 29 of these were found to be defective in expansion on tidal percussion. Where there is defective tidal expansion on one side only, the other side is often above normal because of compensatory increase. This defective tidal expansion of Krönig's isthmus is, therefore, an even earlier sign than contraction of the isthmus. In 24 of these 29 apices, physical signs of disease were found by the ordinary methods. The defective expansion involved the inner border in 11 cases, the outer in 12, and both in 6. A study of 114 cases with a contracted isthmus showed defective expansion of one or both borders in 81 per cent; in the remainder there was no defect, although the majority were diseased apices. This may be explained on the theory that in these cases the lesion was centrally located, permitting both borders to expand normally on deep breathing. The more diseased the apex the more difficult it is to delineate the boundaries of Krönig's resonance, especially in old fibroid cases. In these, so called blurred edges occur and there may also be considerable difficulty in judging the degree of tidal expansion. Displacement of the areas can be demonstrated by comparing the position of the isthmus on each side with fixed anatomic points. The points taken are a curved line from the prominent inner end of the clavicle to the seventh cervical prominence on the inner side, and the depression of the acromioclavicular joint on the outer side. In actual practice one first draws in the curved lines with blue skin pencil; then percusses out the borders of Krönig's areas on each side and marks them, and finally percusses out the tidal expansion of each border and marks it. This can all be diagramatically repre-

sented. The main cause of great contraction of Krönig's area is chronic long-standing fibroid disease, and with this there is marked tidal expansion defect. Wider than normal isthmuses may occur where there is emphysema, local and general (this occurred in 11 out of 170 cases examined). Hyperexpansion of the borders may also occur, but less frequently. In 46 cases discharged from the Derbyshire County Sanatorium, Krönig's areas were reëxamined for comparison. In 41 of 92 apices the areas were increased, in 18 unchanged, and in 33 diminished. But in only 16 of the 92 apices was the tidal expansion increased; this is probably due to the fact that expansile tissue was replaced by scar tissue, or, in those cases where the isthmus was increased, by hypertrophic emphysematous tissue of poor expansile power. *Diagnostic value of contracted Krönig's isthmus:* This is a sign present not only in pulmonary tuberculosis but in other diseases where lung tissue is impaired, such as apical pneumonia and unilateral bronchiectasis. It is of value as a physical sign of tubercle where other symptoms or signs suggest tubercle, and may precede cough and auscultatory signs. A still earlier sign is defective tidal expansion of the isthmus. Bilateral contraction of Krönig's isthmus, along with bilateral tidal diminution at the bases, is an early cardinal sign of bilateral hilum tubercle described by Riviere. *Methods of percussion of Krönig's area:* It is essential to percuss lightly with the patient breathing normally and head bent forward and shoulders relaxed. Only the tip of the middle finger should be used as pleximeter, and it should be laid parallel to the border in percussing. The change in note on passing the border should be definite. In percussing tidal expansion, the patient takes a deep breath and holds it. If the sternomastoid becomes taut one waits a few seconds for it to relax —*Tidal Expanion of Krönig's Areas, A. N. Robertson, Tubercle, August, 1922, iii, 481.*

Pulmonary Tuberculosis Originating at Hilum.—In a case of tuberculosis located in the central area of both lungs, the lesions on one side were comparatively recent. The X-ray pictures were interpreted as evidence that a perihilar tuberculosis had been propagated from the hilum of one lung to the hilum of the opposite side, whence, from the oldest and most extensive lesions, others extended in a fan-like distribution toward peripheral areas. This interpretation was disputed by Kuss and Bezançon. In closing Bernard stated that the facts, which were not in dispute, appeared to him to indicate a special example of a far more general phenomenon. He thinks that the classical teaching which makes the apex the initial seat of pulmonary tuberculosis rests upon an erroneous deduction; that the lesions regarded as initial are in reality terminal results of an old extinct lesion; that beginning lesions in the adult are in the great majority of cases situated at the hilum. In a great number of cases showing a recent initial evolution with the seat at the hilum the apices may be radiologically and stethoscopically normal, or they may show, on one or another side, traces of old lesions giving no signs of evolution, or types which are usual in adults. He has been able to follow cases where the perihilar lesions extended progressively to the apex. In other cases he has observed lesions in the upper portions of the lung associated with signs of recent evolution. One localization particularly frequent is the right superior lobe where a cavity is often formed which in the X-ray picture looks like an appendage of the clavicle, seeming at times to be walled off at the base by a band of interlobular sclerosis. Developing apical lesions appear for the most part to belong to old infections which have gone through several exacerbations. The apical lesions may remain closed, but they may also reawaken; the bacilli which they contain may regain their virulence, and evolution may take place *in situ*. In these cases we observe a genuine apical evolution. But in cases of reinfection the lesions begin generally about the hilum, and it seems permissible to attribute adult lesions localized at the hilum to reinfection.—*La localisation périhilaire initiale de la tuberculose propagée d'un poumon à l'autre, Bernard, Rist and Maingot, Section d'Étude Scientifiques de l'Oeuvre de la Tuberculose, December 10, 1921, reported in Rev. d. l. Tuberc., 1912, iii, no. 1, 86.*

Acute Tuberculous Asphyxia without Miliary Tuberculosis.—The syndrome of acute tuberculous asphyxia, generally considered synonomous with granulitis, may occur in quite different conditions. Two cases observed by Letulle and Bezançon, which from the clinical symptoms, might suggest granulitis, are examples. One was a case of acute tuberculous nodular bronchoalveolitis limited to one lung which had produced innumerable tubercles almost all in the same stage. In the other case there had occurred in a lung already affected with fibrous tuberculosis a rapid development of an intense congestive apoplectiform condition around tuberculous lesions thickly distributed through the lungs. The character of these lesions recalls the appearance of the lungs in experimental reinfection with tuberculosis. Dyspnea also occurs in such

reinfected guinea pigs.—*Deux observations d'asphyxie tuberculeuse aiguë non consécutive à la granulie, Letulle and Bezançon, Section d'Études Scientifiques de l'Oeuvre de la Tuberculose, Paris, February 11, 1922, reported in Rev. d. l. Tuberc., 1922, iii, no. 2, 184.*

Acute Generalized Tubercle Bacillosis without Tubercles.—A remarkable case of acute, larval, miliary tuberculosis furnished histopathological material showing the evolution of a caseous nonfollicular infiltration. The subject was brought to the Boucicaut Hospital suffering from acute febrile progressive erythema nodosum. She was under observation for thirty-two days, in the service of Professor Bezançon, without having shown the least pulmonary symptom that suggested tuberculosis. During the German occupation of Lille the patient had suffered great hardships there, and had been ill or ailing from that time to her death in February, 1921. At the end of 1920 she had been ill with grippe and after this attack had been given an intramuscular injection of an hemopoetic serum; shortly afterward the outbreak of erythema nodusum took place. The autopsy showed an acute miliary tuberculosis and prelumbar and subtracheobronchial adenopathies. Histological examination disclosed an acute, infiltrated bacillosis, without follicles, located in the lymph nodes, the liver, the spleen, pleura, trachea and the muscles of the esophagus. Bacillary emboli were abundant in the tissues. There was an associated esophageal mycosis. Instead of the numerous follicular granulations usually present in an acute granulitis there were, along the blood and lymph paths, innumerable bacillary emboli which had induced a very acute caseous necrosis of all the tissues penetrated by the bacterial toxins. Whatever their situation, the colonies gave rise to foci which, though nodular in outline, were never follicular. All these foci were gorged with bacilli remarkable for their great affinity for stains. In the interior of the islets all the tissues of the organ were dead and unrecognizable; they had undergone a caseous necrosis, preceded or not by acute fibrinification of the connective and vascular tissues and of all the cells living in their meshes. The sections showed that in each tuberculous nodule the invasion of bacilli had been abrupt and massive, almost always by means of vascular emboli. Giant cells were everywhere absent. Almost all the signs of defense, observable after an ordinary granulitis, were here absent; there were no traces of encystment; almost no proliferation of tissues; almost no mobilization of leucocytes. On the contrary, all the areas seemed as though they had been overwhelmed by toxins and unable to make any of the inflammatory reactions of defense. Only in a few islets there remained traces of the necrotic metamorphosis; a few cells still normal remained in the midst of nodules where all the tissues had undergone fibrinoid or granulo-fatty degeneration. Such survivals are very rare, if not altogether unknown, in cases of miliary follicular tuberculosis. But they are frequent in the evolution of syphilitic gummata. In this case the infiltration has taken place in the manner of a gummatous syphilitic infiltration, and shows the distinction between a caseous bacillary infiltration and a follicular evolution caused by the same infectious agent. Many tubercle bacilloses evolve by this method. Examples are the gray, yellow and gelatinoform infiltrations of pulmonary tuberculosis, and many caseous adenopathies, without follicles, of the suprarenal and spleen, forms where bacillary infiltration is observed more frequently than follicles. The evidences of fibrinoid necrosis in this case indicate that, without the intervention of the blood fibrin, the tissues in some regions all underwent a transformation giving them the character of a mass of fibrin. These regions, for the most part, show subsequent caseous infiltrations which conceal, more or less, the fibrinoid degeneration of the beginning. Similar stages of caseous infiltration are frequently observed in many sorts of tuberculosis. These remnants of fibrinoid necrosis in the areas of bacillary infiltration are witnesses of the supra-acute nature of the process at work. They indicate that the toxins in this case acted with the severity of diphtheritic toxins or still more after the manner of radium in contact with healthy mucosa. From the pathological standpoint, and doubtless also in a clinical sense, an infiltrating bacillosis is far more acute than an ordinary tuberculous miliary granulitis.—*Contribution à l'étude de l'infiltration bacillaire caseifiante aiguë généralisée (Bacillose aiguë non folliculaire), M. Letulle and A. Jacquelin, Rev. d. l. Tuberc., 1922, iii, no. 1, 1.*

Digestive Hemoclasia in Pulmonary Tuberculosis.—Observations were made by Dumarest, Brette and Auclair on 24 patients at the Sanitarium Mangini at Hauteville. Of these, 10 gave negative results after ingesting 200 grams of milk; 12 had distinct blood pressure and leucocyte disturbances, the features of which are here considered. Positive results were obtained in patients with a severe tuberculosis in evolution and in patients with benign very long-standing tuberculosis. The liver insufficiency may, therefore, be laid to severe intoxication, or to minimal intoxication extending over long periods. The negative results were, for the

most part, shown by patients slightly affected or greatly improved, in a good state of general health, with normal or nearly normal blood pressure and no signs of evolution. There were, however, three exceptions; patients gravely ill, one of whom, having been an inveterate alcoholic, should have been presumed to give a positive reaction. Parallel tests were made to detect alimentary glycosuria in the 12 patients with hepatic insufficiency. Only one gave a positive reaction, from which it appears that the hemoclastic crisis is a far more delicate sign than alimentary glycosuria of a disturbance in hepatic function. The test may furnish information concerning the resistance of tuberculous invalids.—*Hémoclasie digestive dans la tuberculose pulmonaire, Dumarest, Brette and Auclair, Section d'Études Scientifiques de l'Oeuvre de la Tuberculose, Dec. 10, 1921, reported in Rev. d. l. Tuberc., 1922, iii, no. 1, 93.*

Dangers of Adrenalin for Tuberculosis Patients.—A patient suffering from a bilateral pulmonary tuberculosis, with advanced lesions and low blood pressure was given adrenalin injections. Two doses of 1.5 mgm., injected simultaneously into the two thighs, produced a blood pressure apparently normal, accompanied by several attacks of coughing. Two hours later a copious hemorrhage occurred.—*Du danger de l'adrénaline chez un hypotendu, Colbert and Durand, Section d'Études Scientifiques de l'Oeuvre de la Tuberculose, Dec. 10, 1921, Reported in Rev. d. l. Tuberc., 1922, iii, no. 1, 83.*

Effects of Atmospheric Variations on Pulmonary Tuberculosis.—For over a year note was made of the influence of the atmospheric pressure, winds, humidity and temperature on hemoptyses, congestive attacks, and in general the evolution of pulmonary tuberculosis. The meteorological observations were furnished weekly by the observatory of Lyons. 1. *Effect of atmospheric pressure:* Sharp atmospheric depressions are a frequent indirect cause of hemoptyses, febrile attacks and congestive attacks in the course of the disease. In about 60 per cent of hemoptyses (62 out of 103) such an effect was observed. These observations confirm those of Daremberg, Van Ryn, and Egger. In most of the patients the appearance of blood in the sputum was due to an intercurrent pneumonic process. Hemorrhage due to aneurysmal rupture was not observed in relation to barometric variations. The effect of lowered barometric pressure appears to be exerted chiefly on the congestive rather than the fibroid or fibrocaseous forms of tuberculous lesions. 2. *Effect of winds:* Certain dry winds appeared to provoke hemoptyses; this relation was also observed in about 60 per cent of cases (63 out of 103). These dry winds blew from the north, northwest or south. Damp winds, especially from the south-southwest to west-northwest, were provocative of 17 per cent of hemoptyses. On the other hand, winds during which no hemoptyses occurred were those from the east, north and southwest. 3. *Effect of humidity:* Increased atmospheric humidity has been held responsible for elevation of temperature, congestive accidents, hemoptyses and general increased activity of pulmonary lesions. The present observations indicate but slight influence on hemoptyses. The number of hemoptyses bears no direct relation to the moisture of the air, since 42 hemoptyses were observed with the hygrometer over 70, and 57 under 70. 4. *Effect of temperature:* No serious consequences can be attributed to a sudden fall in temperature, but excessive heat following a cold period may be associated with insomnia, anorexia and slight pulmonary congestion and calls for strict rest. To sum up, sudden atmospheric depressions and dry winds are the two meteorological elements which appear clearly related to small hemoptyoic accidents. The mode of action of these factors is difficult to explain. The dry winds, by cutaneous evaporation, peripheral chilling and desiccation of the mucous membranes, may set up pulmonary congestion and may cause irritation of the bronchoalveolar epithelium. Corollaries of the foregoing may be deduced: 1. *Choice of climate:* For patients with pulmonary tuberculosis, especially the congestive forms, climates without atmospheric variations should be advised. If such variations cannot be avoided, one can at least choose a region least exposed to winds, especially very dry winds. 2. *Prophylactic treatment of congestion and hemoptysis:* Sanatoria should be equipped with a small meteorological station, with facilities for barometer, thermometric and hygrometric observations. At the onset of atmospheric variations, those patients with hemoptyoic or congestive tendency should receive bed rest, mustard footbaths, decongestive medication (ipecac and digitalis), humidification of the atmosphere, etc. Perhaps one might return to the employment of compressed air, by means of pneumatic chambers at a constant pressure when the aforesaid patients might be temporarily sequestrated during passing atmospheric depressions.—*Variations atmosphériques et tuberculose pulmonaire, Piéry and G. Faury, Soc. Méd. d. Hôp. d. Lyon, January 17, 1922, reported in Le Prog. Méd., June 10, 1922, no. 23, p. 409.*

Significance and Prevention of Night Sweats.—There is no evidence that the respiratory centre has anything to do with night sweats. They occur in early pulmonary tuberculosis, when there is no evidence of dyspnea or excess of "carbonic acid in the blood" and disappear when dyspnea is observable. They also occur in Malta fever and rickets. All these sweats should be called slumber sweats. They seldom occur in the advanced dyspnea of emphysema, heart disease, spontaneous pneumothorax or pleural effusions. They should be associated with microbic action, that is, toxemia. The slumber sweat is indicative of an immunized reaction between bacterial products and antibodies and it is quite possible that the inciting cause is the actual presence of bacilli in the blood. At one time the author had an attack of Malta fever and suffered with drenching slumber sweats. By putting a grass mat on the mattress and a sheet over it and sleeping thereon, he found the sweats disappeared. The theory of the sequence of events leading to slumber sweats is: 1. Patient lying still in bed because of toxemia and feeling "rotten," with consequent deficient aeration of body. 2. Heat loss therefore small. 3. Smaller elimination of toxin, because sweat evaporation is less than usual. 4. Accumulation of toxin in body. 5. Stimulation of sympathetic system and causation of sweats. The sweats occur only when there is a great amount of toxin in the blood. *Conclusions:* 1. Night sweats should be called slumber sweats, as they do not occur except when a patient sleeps. 2. In early stages of pulmonary tuberculosis, and in the absence of other infections, they are often the indication of *active* tuberculosis. 3. Slumber sweats cease some weeks before death, because the patient's resistance has been overcome. 4. Slumber sweats can in nearly all cases be prevented without drugs by sleeping on a grass mat over the mattress. 5. Sleeping without a mattress on canvas will stop sweats. 6. The sweats are due to bacterial products (toxins) in the blood (in large quantities); they can therefore occur in any bacterial disease and are not in consequence in any way diagnostic of tuberculosis.—*Night Sweats: Their Significance and Treatment, M. Paterson, Lancet, July 29, 1922, cciii, 225.*

X-Ray Differentiation of Active from Quiescent Pulmonary Tuberculosis.—The utility of X-rays in the diagnosis of pulmonary tuberculosis has been abundantly proved. but the profession as a whole has not yet come to recognize its importance and to avail itself of its aid. There are at least two important reasons for this, namely: 1. To many general practitioners a radiograph of the chest is like a letter in an unknown foreign language. Normal and abnormal lines and shadows cannot be distinguished, and mean nothing to them. The remedy, of course, is to drill the medical student in the interpretation of radiographs. 2. The inability of the X-rays definitely to diagnose tuberculous disease in its earliest stages. The signs of early tuberculosis are not those of consolidation or increased density, but of irritation and toxemia, which are more evidenced by clinical facts than by radiography. In the diagnosis of active from quiescent tuberculosis of the lungs by X-rays one must call to mind the stages traversed by the pathological process. The stages in the production of tuberculosis are: 1. Implantation and development of tubercle. 2. Local necrosis and caseation. 3. Ulceration and cavity formation. In active tuberculosis there are also three associated conditions, namely, congestion, alveolitis and local lymphocytosis. The steps in the process of repair are: 1. Delimitation and localization. 2. Fibrosis and calcification. 3. Contraction of the affected area. Seven conditions caused by tuberculosis may produce shadows in the radiograph: 1. Congestion of blood and lymphatic vessels. 2. Alveolitis. 3. Local lymphocytosis. 4. Infiltrated and proliferated epithelioid cells. 5. Fibroid tissue. 6. Caseation. 7. Calcification. The degree of density produced by these depends on their extent and distance from the plate. The first three or four are alone indicative of activity. These produce, if anything, faint cotton-wool ball-like shadows, resembling the cirrose clouding that one sees in the sky on a summer day. In cases of acute or subacute phthisis, and of chronic disease with a recent exacerbation, it is possible to state definitely that active disease is present. In chronic fibrocaseous tuberculosis it is impossible in most instances to tell from a single radiograph whether or not the disease is active or quiescent. In such cases the decision will be based on clinical facts and serial radiographs. Patients suffering from active tuberculosis always give symptomatic evidence and usually definite signs. Valuable signs and symptoms are muscle spasm, flushing, limited movement of chest wall, excessive sweating, coldness of extremities, lethargy, low blood pressure and adverse influence of exercise on temperature and pulse. Serial radiographs are very useful and suggestive and should be kept on file for reference and comparison. A ring shadow may appear in the lung without previous consolidation and may be ascribed to infiltration followed by rapid disintegration with little or no collateral inflammation or effort

at encapsulation. Advancing disease is generally characterized by: 1. Diffuse haziness about the affected areas. 2. Increased budding from the trunks proceeding from the hilum toward the periphery. 3. Coalescence and clouding of the buds. 4. Increasing density of the shadows, with peripheral spreading and mottling. 5. Appearance or increase of areas of rarefaction. In retrogressive disease one finds: 1. Disappearance of mottling and haziness (except where due to thickened pleura). 2. Increased density of shadows with more sharply defined borders. 3. Retraction of densities with sometimes lessened opacity. 4. Widening of interspaces and greater mobility. *Summary:* 1. Radiography does not show the presence of the earliest stage of active tuberculous disease of the lungs. Radioscopy (fluoroscopy) may reveal it by diminished translucency, lessened mobility of chest wall and a "stammering" diaphragm. 2. Acute and progressive tuberculosis shows itself by the presence of budding and cirrose clouding, and by accentuated trunks radiating from the hilum, chiefly caused by hypervascularization. 3. In chronic fibrocaseous tuberculosis a single radiograph frequently fails to determine quiescence or activity. Serial radiographs at four to six weeks' intervals are valuable. 4. Radiography should be used simply to amplify and can never supersede clinical methods.—*Differentiation of Active from Quiescent Tuberculosis of the Lung, J. Crocket, Brit. M. J., September 23, 1922, no. 3221, p. 560.*

Studies on Virulence of Tubercle Bacilli.—Fernbach and Rullier made two communications giving additional evidence of results previously made known, namely, that although cultures of the Vallée bovine strain of the Pasteur Institute had their virulence only slightly diminished by digestion in an artificial gastric juice, being still capable in most cases of provoking a generalized tuberculosis or at least a lymph node tuberculosis accompanied by abdominal lesions, especially of liver and spleen, the bacilli of pulmonary tubercles taken from animals infected by cultures from the same stock lost their virulence by artificial gastric digestion to such an extent that an emulsion made from the tubercles never produced evidences of tuberculosis when injected into guinea pigs. Two new series of experiments were described. The first one, made with pulmonary tubercles, was devised especially to answer the objection that the number of bacilli might have been less in the tissue emulsions than in the material injected from laboratory cultures. From computation of the number of bacilli contained in the emulsions, it was estimated that not less than 1,800,000 germs were injected in the largest doses, that is, nearly 180,000 times enough to infect a guinea pig. The second series of experiments was made from tubercles taken from the spleen, which, having a lower resistance to the tubercle bacillus than the lungs, might perhaps harbor bacilli that would be affected differently by artificial gastric digestion. But in spleen tubercle emulsions also, three hours digestion at 52° to 53° abolished the virulence of the bacilli. In both series of experiments all the controls developed tuberculosis within nine days. Among the animals injected with emulsions of lung tubercles, 60 per cent were alive and free from evidences of tuberculosis two hundred and fifty days after inoculation. A vigorous search demonstrated no signs of tuberculosis in the 40 per cent that have died. In the series injected with spleen tubercles no signs of tuberculosis were present at the end of nine weeks. Local lesions were absent in most cases; the exceptions which occurred were explainable as due to irritation caused by injection of such large masses of substance or to accidental contamination; they never resembled tuberculous lesions. Artificial digestion, therefore, annihilates the virulence of tubercle bacilli more completely than death by heating, since injection of bacteria killed by heat produces suppuration and may even cause the formation of nonbacillary tubercles.—*1. Innoculation au cobaye de doses croissantes de granulations pulmonaires (tuberculose expérimentale du cobaye) après digestion à 52° par un suc gastrique artificiel. (Première note complémentaire.) 2. Action d'un suc gastrique artificiel sur la virulence des granulations de rate provenant de la tuberculose expérimentale du cobaye. (Deuxième note complémentaire), Fernbach and Rullier, Section d'Études Scientifiques de l'Oeuvre de la Tuberculose, Paris, Jan. 14, 1922, reported in Rev. d. l. Tuberc., 1922, iii, no. 2, 160.*

Effect of Incubation on Tuberculous Sputum.—The method of Bezançon, Mathieu and Philibert was employed and their results confirmed. In every case where direct examination showed the presence of bacilli there was apparent enrichment. In 20 cases where direct examination was negative, the results of the enrichment method were parallel. In 4 cases where the result of homogenization was negative, the enrichment method yielded positive results. Finally, in 2 cases where all previous examinations had been negative, homogenization after enrichment yielded positive results. The authors therefore believe that often the simple technique of enrichment will come

to replace the rather complicated technique of homogenization (concentration). This last, done after enrichment, will give better results than previously.—*Enrichissement apparent des crachats tuberculeux par séjour à l'étuve, S. I. Jong and P. Hillemand, Meeting, Société Médicale des Hôpitaux, May 12, 1922, reported in Le Prog. Méd., June 3, 1922, no. 22, p. 263.*

Isolation of Tubercle Bacilli from Pus with Petroff's Medium.—Tzetzu found Petroff's medium very favorable for growing tubercle bacilli, inasmuch as they grow almost alone in it. From pus containing no visible germs he grew colonies before guinea pigs were tuberculized, even before induration of the lymph nodes.—*Isolement direct sur millieu de Petroff des bacilles tuberculeux provenant d'abscess froids, Tzetzu, reported from Société de Biologie, Paris, in Presse Méd., June 10, 1922, xxx, 503.*

Rapid Isolation of Tubercle Bacilli from Urine.—In a previous announcement it was shown that, by using Petroff's culture medium, colonies could be grown more rapidly than the diagnosis could be made by means of guinea pig inoculation. It has been found best always to treat the urinary sediment with sodium hydroxide; by this means the tubercle bacillus can always be isolated from other germs that may be present. Cultures from urine are often contaminated, but tubercle bacilli should be sought over the entire surface; if the latter are found, the diagnosis is established. From Petroff's medium the bacilli may be transplanted to glycerinated potatoes. Sometimes in Petroff's medium little colonies of tubercle bacilli are found dry on plates where the medium is almost completely liquefied. Experiments to find a still better culture medium have led to the use of one made as follows: 200 cc. of sterile Besredka's medium, 100 cc. of boiled skimmed milk, 15 grams of glycerine and 9 grams of agar. The mixture is heated on a water bath until the agar is dissolved, sterilized in the autoclave at 105°, and before cooling 3 cc. of a 1 per cent alcoholic solution of gentian violet is added. The medium is then tubed and the tubes heated from 55° to 57° for half an hour on three successive days. The results seem slightly superior to those obtained with Petroff's medium. Positive results are frequently obtained from urine in less than forty-eight hours.—*Sur le diagnostic rapide de la tuberculose des voies urinaires sans inoculation au cobaye. Nouveau medium de culture plus rapide, V. Despeignes, Compt. Rend. Soc. d. Biol., June 17, 1922, lxxxvii, 119.*

Moro's Diagnostic Tuberculin.—The significance of the Pirquet skin test in the diagnosis of tuberculosis in childhood has of late been questioned, because of certain apparent failures of the reaction in undoubted cases of tuberculosis. This failure has been ascribed by some to the influence of the war and its consequent poor nutritional states, and by others to a poorer grade of tuberculin. Moro tried to overcome the latter factor by the introduction of a new, double strength tuberculin. During the winter of 1920–1921, forty-eight children with clinically manifest tuberculosis were tested with both Moro's tuberculin and Höchst O. T., using the same technique. One case reacted only to Moro's tuberculin, ond in the remaining 47 Moro's tuberculin gave a stronger reaction in 16, weaker in 17, and a reaction of the same degree in 14 instances. From this it may be seen that there were no appreciable differences between the two preparations, and individual variations may perhaps be ascribed to differences in the rapidity of absorption of the two fluids of different concentration.—*Einige Bemerkungen über das diagnostische Tuberkulin nach Moro, W. Röckemann, Monatschr. f. Kinderhk., May 1922, xxiii, 183.*

Influence of Oxidizing Agents on Skin Reaction.—Bouveyrou reports that oxidation brought about directly or indirectly with a great many oxidizing agents either prevents or diminishes the action of tuberculin on the skin. Apparently the sulphur group and the cystine are particularly implicated, but with complex oxidizing reagents the amine group may also be attacked, and such reagents alter tuberculin more completely than simple ones, such as ozone.—*Sur la cuti-réaction à la tuberculine, Bouveyron, Soc. de. Biologie, Paris, reported in Presse Méd., June 14, 1922, xxx, 514.*

Influence of Nonspecific Irritants on Cutaneous Tuberculin Reactions.—The beneficial effects, in certain cases of tuberculosis, of treatment with nonspecific proteins, and the alleged similarity of results between skin tests with tuberculin and these other substances, have raised considerable doubt in the minds of some investigators as to the specificity of the tuberculin reaction. The present study was undertaken in order to determine whether or not a previously negative tuberculin test could be made positive by means of injections with a nonspecific protein such as aolan. Accordingly, 114 children, each with two previously negative skin tuberculin tests, were injected with 0.2 cc. aolan, in 3 instances intramuscularly and in 111 instances intracutaneously. The leu-

cocyte count showed at first a sharp rise (in one case to double the normal), to be followed in six to eight hours by a marked diminution in the white cells, often to one-third the normal. The differential count remained unchanged, and within 28 to 30 hours the blood picture had again returned to normal. In no case did the previously negative Pirquet test become positive as a result of such injection of nonspecific protein. An investigation was also made of Zieler's assertion that minute traces of tuberculin may remain in a tuberculin syringe even after careful cleansing and are capable of producing positive reactions by contaminating other substances used for injection. A syringe, which had previously been filled with tuberculin, was rinsed ten times with distilled water, ten times with 70 per cent alcohol and ten times with ether, following which it was sterilized twenty minutes at 110° to 120° C. This was now filled with physiological salt solution for injection, and, as controls, a new, previously unused syringe was filled with a similar salt solution, and a third syringe with tuberculin (injecting 0.00002 cc. O. T.). Five tuberculous children were each given 0.2 cc. of the above fluids intracutaneously; the next day all the children showed an equal amount of redness and infiltration (3 x 3 cm. in diameter) at the sites of all three injections. The second and third day there was less redness but the infiltration remained unchanged. On the fourth and fifth days, in 2 children, all redness and infiltration had disappeared, but in the 3 remaining children there was a distinct difference in the lesions. In these, at the seventh day, all redness and infiltration had disappeared at the site of the injection of the "clean" saline solution, whereas there was still a distinct reaction at the site of the injection of the saline from the tuberculin syringe, though less pronounced than that caused by the known tuberculin. On the ninth day all traces of the reactions had disappeared. In one case, five days after the complete subsidence of the reactions, a subcutaneous injection of 0.1 mgm. tuberculin produced a focal reaction in the chest and a flaring up of the old reactions produced by the tuberculin and salt solution from the tuberculin syringe, but no reaction at the site of the saline injection from the clean syringe. Zieler's observations were therefore substantiated. Cleansing the syringe with chromic-sulphuric acid, however, was found effective in removing all traces of tuberculin.—*Über den Einfluss des Aolans als unspezifischer Reiskörper auf den Ausfall der kutanen Tuberkulinreaktionen, J. Bergmann, Monatschr. f. Kinderhk., July, 1922, xxiii, 391.*

Reinfections before and after Allergy.—It is a familiar fact that reinfection of a tuberculous guinea pig does not always produce Koch's phenomenon; on the contrary, the lesion may resemble the primary inoculation lesion, or it may be a nodule which becomes rapidly caseous. Bezançon and Serbonnes observed that the production of Koch's phenomenon depends on two factors: 1. Time. Early reinfection produces an abscess; late reinfection, Koch's phenomenon. 2. The dose of bacilli injected at the first inoculation; the larger the primary dose, the earlier Koch's phenomenon appears. Wishing to observe whether the animal's reaction was the same before and after a state of allergy had been established, three lots of guinea pigs were injected in the following manner: one series was given 0.1 mgm. of tubercle bacilli on each of five successive days; a second series was given the same dose five times at five-day intervals and a third series the same dose five times at ten-day intervals. In the guinea pigs injected every day the five nodules were identical; they had the same period of incubation, 8 to 10 days, the same evolution, and there was the same reaction of lymph nodes. In some cases the fifth nodule did not ulcerate. Inasmuch as the first reactions appeared from the eighth to the tenth day, all the identical nodules are due to inoculations made in the ante-allergic period. In the second series the first two nodules were identical and the lymph node reactions similar; both these inoculations belong to the ante-allergic period. The third nodule appeared precociously and remained much smaller than the two earlier ones; it did not ulcerate; it provoked only slight lymph node reactions. The fourth and fifth inoculations produced results similar to the third. In the third series the nodule made by the first inoculation was an ordinary one; the second, made at the beginning of the allergic state, produced results similar to the third, fourth, and fifth inoculations of the second series; the third nodule evolved in the same way; the fourth inoculation produced, sometimes a typical Koch's phenomenon, sometimes the mixed results previously observed by Bezançon and Serbonnes, that is, rapid abscess formation followed by cicatrization without lymphatic reaction. The fifth reinfection regularly produced the typical scarification described by Koch. These results not only confirm the facts of gradation pointed out by Straus, Bezançon and Serbonnes, and Rolland, but they show the essential difference in the reactions of animals tuberculized before and after the production of allergy; in the ante-allergic period all inoculations, whatever the interval between

them, give identical results, that is, the reaction is like that in virgin soil. After the establishment of allergy, shown by the capacity of reacting to tuberculin, the behavior of the animal toward reinfection is modified: the results produced by tuberculin and by reinfection run parallel, that is, when the animal is able to produce Koch's phenomenon after bacillary reinfection it reacts to intracutaneous inoculation of tuberculin with a scar. These findings show a resemblance to those observed in experimental syphilis in which it was found possible to produce a series of chancres by reinfection of monkeys with syphilitic virus when inoculations were made before the appearance of the first chancre, and impossible, or very difficult, to produce such lesions after the first chancre had appeared. The results may also be looked upon as having a anatomo-clinical analogy to the tuberculosis of infancy, which resembles the experimental tuberculosis of guinea pigs. Nurslings in intimate contact with a phthisical mother may undergo a number of infections during the ante-allergic period, and these infections may produce separate lesions capable of developing in the lungs, whereas infants in less intimate contact with infected persons have a chance of escaping reinfection until a state of allergy is produced.—*Surinfection du cobaye tuberculeux avant et après l'etablissment de l'etat allergique, R. Debré and H. Bonnet, Compt. Rend. d. Soc. Biol., July 8, 1922, lxxxvi, 449.*

Prognostic and Diagnostic Value of Antibodies.—Armand-Delille, Hillemand and Lestocquoy have made a year's systematic study of the sera of patients in their service. They found that the antibody-content varies in a way which makes their determination of no great diagnostic or prognostic value. For example, in 34 improved cases the antibody-content increased in 12, diminished in 15 and varied in 7. In 39 aggravated cases there were 16 increases, 13 decreases and 10 irregularities in the antibody-content; hence, the danger of basing a diagnosis of tuberculosis on positive antibody reactions when the clinical and radiological signs are negative.—*Recherches sur la valeur diagnostique et prognostique des anticorps tuberculeux, Armand-Delille, Hillemand and Lestocquoy, Société Médicale des Hôpitaux, reported in Presse Méd., June 3, 1922, p. 263.*

Complement Fixation with Peptone B² of Calmette and Massol.—The percentage of positive reactions is much smaller than with Besredka's antigen. The circumstance that the requisite dose of antigen is very near to the dose of anticomplement makes the reaction difficult to interpret on account of the great variability of the complement content of fresh sera.—*Réactions de fixation dans la tuberculose à l'aide de l'antigene peptone B² de Calmette et Massol, P. Çrampon, Compt. Rend. Soc. d. Biol., May 13, 1922, lxxxvi, 1025.*

Diagnosis of Tuberculosis with Besredka's Antigen.—Massias found the reaction specific for blood and cerebrospinal fluid. He found it positive in 92 per cent of developing tuberculosis; it was positive in 1 case of erythema nodosum and in 6 cerebrospinal fluids in cases of tuberculous meningitis.—*Le sero-diagnostic de la tuberculose dans le sang et le liquid cephalo-rachidien avec l'antigene de Besredka, Massias, reported from the Reunion Biologique de Bordeaux, Presse Méd., June 21, 1922, xxx, 536.*

Complement Fixation with Besredka's Antigen.—Kuss and Rubenstein report their findings in 59 cases investigated with Besredka's new antigen. In 28 tuberculous patients the reaction was negative 24 times. These were not healthy subjects, but persons with slight bronchial or pulmonary symptoms of a kind which bring them to anti-tuberculosis dispensaries. Of the 31 classed as tuberculous, 3, all of whom gave negative reactions, had merely scars of old tuberculosis. Excluding these, 82 per cent gave reactions in accordance with the clinical findings. With the present antigen the reaction is more delicate; it is positive more frequently in inactive, latent and extinct forms and consequently a positive reaction no longer indicates some degree of activity in a tuberculous subject. In medical practice it should be utilized as one of a number of findings; it should not be depended upon alone.—*Réaction de fixation dans la tuberculose avec l'antigène de Besredka, Kuss and Rubenstein, Section d'Études Scientifiques de l'Oeuvre de la Tuberculose, Paris, Nov. 12, 1921, reported in Rev. d. l. Tuberc., 1922, iii, no. 1, 72.*

Durability of Besredka's Antigen.—New tests show that egg antigen has lost none of its sensitiveness after fifteen months. In an emulsion of bacilli preserved for fifteen months the bacteria have no power of fixation, but the active products are almost completely preserved in the salt solution. It seems, therefore, that the antigen preserves its activity indefinitely.—*Durée de conservation et préparation de l'antigene à l'oeuf, Urbain, Section d'Études Scientifiques de l'Oeuvre de la Tuberculose, Paris, Dec. 10, 1921, reported in Rev. d. l. Tuberc., 1922, iii, no. 1, 81.*

Complement Fixation with Alcohol and Egg Antigens.—Bernard and Valtis tested the complement fixation in sera from 92 patients, using the methyl antigen of Boquet and Nègre simultaneously with Besredka's egg antigen. The patients comprised 50 with pulmonary tuberculosis, 5 with pleurisy and 36 nontuberculous invalids. The results were approximately identical with the two antigens. The exceedingly small differences that occurred in the two series point to a slightly greater delicacy in the alcohol antigen reaction. But, considering the small number of tests, the differences may for the present be considered negligible.—*Réaction de fixation et tuberculose, Bernard and Valtis, Section d'Etudes Scientifiques de l'Oeuvre de la Tuberculose, Paris, Jan. 14, 1922, reported in Rev. d. l. Tuberc., 1922, iii, no. 2, 170.*

Precipitin and Complement Fixation Reactions with Tuberculous Exudates.—As the demonstration of tubercle bacilli in tuberculous pleural fluids is frequently impossible, studies were made with the precipitin and complement fixation reactions. Tuberculosis-immune goat and calf sera were used for the precipitin tests in 0.1 cc. amounts, and the results read after one and twenty-four hours, respectively. For the complement fixation tests Petroff's glycerine antigen of human tubercle bacilli was used according to a new method about to be published by Kolmer. This method takes into account the anticomplementary activity of the serum to be tested. Primary incubation was eighteen hours in the ice-box plus ten minutes in a water bath at 38°C. The secondary incubation was one hour in the water bath the reading being made a few hours later. *Results:* 1. A series of twelve human tuberculous pleural exudates gave 42 per cent weekly positive precipitin and 92 per cent definitely positive complement fixation reactions. Five nontuberculous pleural exudates gave negative precipitin and complement fixation reactions, except in one instance of the latter in which there was a complicating syphilis. 2. Pleural exudates, secured fifteen days or longer after experimental tuberculous pleuritis in a series of guinea pigs, yielded 8 per cent weekly positive percipitin reactions and 89 per cent strongly positive complement fixation reactions. These animals were infected with injections of virulent bovine bacilli into the right pleural sacs. This produced usually a well defined pleuritis on both sides. In many instances a pericardial effusion also resulted. No positive reaction was observed in fluids removed earlier than twelve days after infection. The sera of a number of these animals were also tested. All gave negative precipitin reactions and five positive complement fixation. The sera of thirty control guinea pigs gave uniformly negative complement fixation. 3. The pleural fluid from rabbits, intrapleurally infected with tubercle bacilli, gave results similar to the guinea pig experiment animals as regards complement fixation. Only one fluid, however, yielded a positive precipitin test. The sera of all rabbits yielded positive complement fixation tests, but the well known property of normal rabbit sera for yielding positive nonspecific complement fixation is pointed out. These results indicate that, in the exudates of tuberculous pleuritis, precipitins and especially complement-fixing antibodies are found in a large percentage, and that a sensitive complement fixation test with special attention to certain technical features may prove a valuable aid in diagnosis.—*A Study of the Precipitin and Complement Fixation Reactions with Tuberculous Exudates with Special Reference to Tuberculous Pleuritis, I. Ogawa, Jour. Immunol., September, 1922, vii, 423.*

Agglutination Reaction for Tuberculosis.—In 150 cases of pulmonary tuberculosis Courmont observed the skin and agglutinating reactions and the deviation of complement. Nothing new was noticed in regard to the skin reaction. He found the complement reaction almost constantly positive and nearly equal in all cases. It has, consequently, but slight value for prognosis. Serum agglutination, on the contrary, is less constant and it gives a wider range of values. Its disappearance in the course of a pulmonary tuberculosis is almost always a bad sign. A high agglutinating value alone is not sufficient to establish a favorable prognosis, but, in general, agglutination is absent, slight or diminishing in the course of an unfavorable evolution of tuberculosis. Its values increase progressively in tuberculosis which is recovering. It is, therefore, extremely useful for prognosis; the technique of the reaction is also simple and easy. These results correspond with Courmont's previous findings in tuberculous pleurisies, namely, that pleurisies in process of cure have agglutinating effusions in 75 per cent of cases, whereas 75 per cent of cases with non-agglutinating fluids are fatal, exception being made of pyoid effusions of artificial or spontaneous pneumothorax which have little agglutinating power even though benign. Such cases, however, are extremely chronic and, though not fatal, they are not undergoing the favorable development of pleurisies with agglutinating effusions.—*Comparison de la sêro-agglutination et de la déviation du complément dans la tuberculose, Courmont,*

Section d'Études Scientifiques de l'Oeuvre de la Tuberculose, Paris, Jan. 14, 1922, reported in Rev. d. l. Tuberc., 1922, iii, no. 2, 168.

Tuberculosis in Infancy and Childhood.—It is characteristic of tuberculosis in early life to cause considerable fever with little leucocytosis or increased polynuclear count. There is little emaciation, and the pulmonary lesion is likely to be basal. Curative agents in order of comparative value are: (1) fresh, outdoor, moving air, cold if possible; (2) heliotherapy, considered dangerous in lung tuberculosis at Rollier's sanatorium but without bad results in the author's experience; (3) codliver oil; (4) a full diet and complete rest for a long period. Localized tuberculosis in infancy may be cured by prompt interference, but, if it involves the lungs, it becomes generalized and the prognosis is bad. In infancy and early childhood the disease causes little emaciation. If a child with a chronic lung lesion becomes emaciated, the probability is that the condition is not tuberculous.—*Prognosis and Treatment of Tuberculosis in Infancy and Childhood, R. G. Freeman, Meeting, American Pediatric Society, May, 1922, reported in Arch. Pediatrics, June, 1922, xxxix, 403.*

Tuberculosis in Childhood.—Tuberculosis in childhood is composed of three large symptom-groups: (1) the exudative diathesis, (2) disease of the lungs, and (3) hilum changes. Under (1) is included the old picture of "scrofula," which will not be discussed in this paper. Tuberculous involvement of the lung parenchyma is, in its early stages, exceedingly difficult to diagnose, and very frequently a suspected apical tuberculosis, or even involvement of the lower lobes, is proved by subsequent developments to be nontuberculous in character. Slight and fleeting changes in the percussion note over the apices or between the scapulae must be regarded as due to errors in technique in the vast majority of cases, rather than to an acute and transient swelling of the hilum nodes. Chronic apical catarrh, with râles, prolonged expiration and definite dulness undoubtedly occurs, but is very rare, as is shown by the fact that among 735 infected children such changes were found in less than 14 per cent, and not all of these were found to be tuberculous. Of 784 children sent to the hospital with supposed pulmonary tuberculosis, only 8 per cent showed changes in the lower lobes, again, not all of a tuberculous nature. Hilum tuberculosis is undoubtedly the most important group of all, but it is precisely in this group of cases that the roentgenologist most frequently falls down, for often he will not venture a diagnosis unless there is marked stippling or streaking extending out into the lung parenchyma. Indeed, even after clinical study, many such cases remain indeterminate. Of 155 roentgenographs of children with scrofula or mild tuberculosis, in only eight instances (6 per cent) were shadows found which were thought to be due to the so called "primary focus" of Ghon. These 155 plates could be placed in three groups: 1. Tuberculosis of the root of the lung with spotted and striped hilum markings in 30 per cent, and of these only 16 per cent showed positive lung findings with a positive tuberculin test. On the other hand, in 16 per cent of this group, although the clinical findings coincided with the roentgenograph, the tuberculin test was negative, whereas in about 30 per cent the Pirquet was positive but clinical evidence was lacking. 2. Widening or accentuation of the hilum markings, not absolutely characteristic of tuberculosis, in 68 children (60 per cent). Of these, although four-fifths of the children showed a positive tuberculin test, only twenty-eight (40 per cent) gave clinical evidences of tuberculosis. 3. Very slight or absent hilum changes in 10 per cent, although more than 90 per cent of the children in this group gave a positive Pirquet. Clinical symptoms due to pressure from the enlarged mass of tracheobronchial nodes, while their presence may be of value in the diagnosis, were distinctly infrequent. Thus, the D'Espine sign was found in 20 per cent, inequality of the pupils (supposedly due to pressure on the sympathetic nerve) in 7 per cent, and distention of the venous capillaries of the skin on the chest in only 6 per cent.—*Zur Kenntnis der Kindertuberkulose, R. Zimmermann, Ztschr. f. Kinderhk., March 15, 1922, xxxii,142.*

Surgical Tuberculosis in Children.—The Queen Mary's Hospital for Children is the largest of those maintained by the Metropolitan Asylums Board, situated at Carshalton, on the Surrey Downs, in a park of 136 acres. It contains 810 beds, the accommodation being provided in 16 ward blocks and 2 isolation blocks. The administrative block occupies a central position, a main central avenue running north and south, from which six streets, arranged *en echelon*, give access to the six ward blocks and attached staff homes. Verandas, each containing 30 beds, have been added to ten of the ward blocks, thus enabling 300 children to lie in the open air, winter and summer, day and night, and almost completely free from colds and infectious diseases. Extensive use is made of direct sunlight, the courtyards being open only to the south, with verandas

on the three remaining sides. It has not been found that the degree of pigmentation bears any relation to the prognosis of surgical tuberculosis in children. Specially designed orthopedic carriages for use in spinal caries have proved of great value in carrying out the sunlight treatment. The apparatus is made in the hospital workshops. The results of treatment of tuberculosis of the spine and joints are striking, especially in cases taken in hand early. In the advanced cases treatment must be prolonged and costly and there is more or less permanent deformity. A large number of children with tuberculous lymph nodes are admitted, many having previously been operated on. These cases are now being treated with radium. An applicator containing 15 mgm. of radium bromide is applied once a week for four hours at a time to each node. Caseous nodes usually need 40 to 50 applications, simple nodes fewer. Several cases of lupus are being treated by thorough scraping, followed by application of acid nitrate of mercury. Teaching is carried on in twenty wards, and convalescent classes are held in the hall and open courtyards, a full-time staff of 21 teachers being employed. Any child under the age of fifteen, whose parents are resident in a London parish, is eligible for admission to the hospital on making proper application.—*Surgical Tuberculosis in Children, The Work of the M. A. B., Lancet, September 23, 1922, cciii, 682.*

Infants of Tuberculous Parents.—Early in their paper the authors state their agreement with Comby's assertion that "Heredity of the soil does not exist any more than heredity of the seed," urging that heredity of tuberculosis does not exist in any sense, and that the disease is always acquired by exposure to contagion, even in early infancy. From a study of 276 tuberculous mothers with their infants at the *Crèche de l'Hôpital Laennec*, accurate and complete data having been obtained for 127 cases, the authors draw conclusions which are at variance with those of many other writers. The study is unique in that this rather large number of infants was separated from their parents before contamination could take place. Such contamination has been found to take place even during the first few days of life. The infants thus separated from sources of infection have been studied by cutaneous tuberculin tests, clinical examinations, and X-rays. The authors' conclusions follow: 1. Pulmonary tuberculosis is undeniably a cause of prematurity, but only when the disease is advanced. 2. The birth-weight of children of tuberculous parents is about the same as that of children of healthy parents, unless there is advanced maternal tuberculosis. 3. Tuberculosis with onset toward the end of pregnancy has little or no effect upon the birth-weight of the infant; whereas tuberculosis with onset prior to pregnancy may have a variable effect, depending upon its severity. 4. Maternal tuberculosis progressing rapidly during pregnancy resulted in a prematurity-rate of 43 per cent, and in a moderate lowering of the birth-weight of the full-term infants. 5. When both the father and mother are tuberculous, the weight of the infant is less than normal, which would seem to be due principally to poor living conditions. 6. The infant of tuberculous parentage is no more likely to present congenital malformations or other pathological conditions than is the infant of healthy parentage. 7. If the infant of tuberculous parentage is withdrawn immediately from the source of contagion, he will develop as a normal infant, and is no more liable than the normal infant to infections or other diseases.—*Le nourrisson issu de parents tuberculeux, R. Debré and L. Laplane, Le Nourrisson, July, 1922, x, 249.*

"Splenopneumonic" Reactions in Pulmonary Tuberculosis of Children.—This is a congestive reaction of the lungs, giving the clinical type of the so called *Grancher's spleno-pneumonie*, but invading the whole lung. It is associated with pulmonary tuberculosis in young people. The radiographs show a deep opacity, extending throughout one lung with stethacoustic signs of extensive condensation similar to pleurisy, but without any fluid at puncture. Often, after a continued fever, called in France *Landouzy's typhobacillosis*, the signs of condensation of one lung appear by degrees. Many of the children have previously had symptoms of tracheobronchial adenopathy. Signs may first appear at the apex or at the base, and at the beginning it appears to be a pleurisy, but often the whole lung is invaded at the same time. Consolidation becomes nearly complete, vibrations disappear, and sometimes tubular breathing is so strong that it takes on an amphoric character. Radioscopy shows, in addition to the opacity of the lung, that the diaphragm is not immobilized as in pleurisy, the mediastinum is not displaced and the shadow is thicker in the median part of the lung than at the base. The pleural sinus sometimes keeps its transparency. Sometimes in a limited area, more often at the apex, there is a clear zone of disintegration having the appearance of a cavity; in such cases râles are heard and the area corresponds to the focus of tuberculosis. The pleura is free in these cases and an arti-

ficial pneumothorax can be induced. Reabsorption of the process in the pure splenopneumonic forms may be progressive although slow and incomplete; the radiograph usually shows some opaque tracts extending from the hilum along the bronchial trunks. Healing is aided by general physiotherapy and heliotherapy. In other instances a caseous pneumonia with cavitation follows, and in the third group a sclerosis of the lung, with pleural adhesions, retraction of the chest wall and mediastinum, and sometimes later bronchial dilatations, appears. These special forms of splenopneumonic reactions were observed in 10 of 120 children in a tuberculosis ward within three months.—*The "Spleno-Pneumonic" Reactions in Pulmonary Tuberculosis, P. F. Armand-Delille, Meeting, American Pediatric Society, May, 1922, reported in Arch. Pediatrics, June 1922, xxxix, 353.*

Consolidation of Lungs in Infantile Tuberculosis.—Armand-Delille, Georges and Ducrochet report three cases of great consolidation of one lung. In these cases pneumothorax showed the lung to be nearly incompressible. Such a massive solidification constitutes a mode of reaction peculiar to infantile tuberculosis.—*Sur quelques cas de réactions splenopneumoniques étenues au cours de la tuberculose pulmonaire infantile, Armand-Delille, Georges and Ducrochet, Meeting, Société des Hôpitaux, May 26, 1922, reported in Presse Méd., May 31, 1922, xxx, 470.*

D'Espine's and Allied Signs in Childhood.—The sign to which D'Espine originally called attention was a whispered sound following the spoken voice and heard over the spinous processes. Normally, no such sound is heard and D'Espine believed it to be the earliest sign of enlargement of the tracheobronchial lymph nodes. He considered that the extension of the bronchial voice below the seventh cervical spine is always a later sign than the addition of the whispering voice to the spoken voice, and that it meant a more advanced process. He paid little attention to the character of the whispered voice (meaning by this a whisper, not the whispering sound heard after the spoken voice), and believed that extension of the bronchial respiratory sound and dulness on percussion below the seventh cervical spine was a still later manifestation, and that it signified much more marked changes. He also warned against mistaking an unusually loud or deep voice for bronchophony, and stated that sometimes it was impossible to determine anything from the voice itself, because of its peculiar character and the thinness of the chest wall. Morse examined 118 patients from two to fourteen years of age. In 88 cases, or nearly 75 per cent. there was no whispered sound after the spoken voice; in 24 it was heard through the seventh cervical spine, and in 6, below it as well. A whispered sound after the spoken voice is therefore probably abnormal. The change from bronchial to vesicular in the spoken voice took place between the seventh cervical and thoracic spines in 90, and above it in 9. There was no bronchial voice anywhere in 9; in only 6 did the bronchial voice extend below the seventh cervical spine. The change from a bronchial to a vesicular whisper took place between the seventh cervical and first dorsal spines in 87 instances. The change from bronchial to vesicular respiration occurred between the seventh cervical and first dorsal spines in 97 instances. In only 15, or less than 13 per cent, did the bronchial respiration extend below the seventh cervical spine. The spinal dulness stopped at the seventh cervical spine and above it, in one. In 54 instances, there was no whispering sound after the spoken voice. The changes from bronchial to vesicular in the spoken and whispered voices and in the respiration occurred at the junction of the seventh cervical and first dorsal spines; there was no dulness below the seventh cervical spine and no interscapular dulness. After a detailed analysis of these cases, it seemed fair to conclude that when there was no whispering sound after the spoken voice, the bronchial voice, whisper and respiration and the spinal dulness did not extend below the seventh cervical spine, and there was no interscapular dulness, conditions were normal. It seemed probable that they were not normal when the bronchial voice, bronchial whisper, bronchial respiration and spinal dulness extended below the seventh cervical spine. They were certainly abnormal when there was interscapular dulness. The whispering sound after the spoken voice, D'Espine's sign, is often the earliest and only abnormality. It may, however, be absent when one or more of the other signs are present. The whispered voice is a somewhat more delicate test of pathological changes in the tracheobronchial region than is the spoken voice. The respiratory sound has an intermediate value. The value of percussion over the spinous processes is about the same as that of the respiratory sound. Interscapular dulness is a late sign and is found only when the pathological changes are considerable.—*D'Espine's and Allied Signs in Childhood, J. L. Morse, Meeting, American Pediatric Society, May, 1922, reported in Arch. Pediatrics, June, 1922, xxxix, 355.*

Diagnostic Value of Epitrochlear Adenitis in Young Children.—Eighteen hundred and two children were examined. Of 112 cases of active syphilis, epitrochlear adenitis was found in 71 per cent; of 154 with latent syphilis, it was present in 63 per cent; epitrochlear enlargement was found in 83 per cent of the cases of syphilis with tuberculosis, in only 21 per cent of the cases of rickets, in 26 per cent of the tuberculous children, and in 39.5 per cent of the 909 children with other affections.—*Sul Valore diagnostico dell'Adenite epitrocleare nella seconda e terza Infanzia, S. Fabbris, La Pediatria, June 15, 1922, xxx, 560.*

Diagnosis of Tuberculous Tracheobronchial Lymphadenopathy in Children.—Cases of tracheobronchial lymphadenopathy whose tuberculous origin can be definitely determined by clinical examination or by X-rays, are unusual. We must turn to the various laboratory tests for help in diagnosis, and the results of such tests must be given only relative value. After a brief discussion of the many tests which have been advocated by different authors, the writer presents the results of examination of 100 children, ranging in age from two to fifteen years (the majority being over five years). The laboratory tests used in this series were the ordinary Pirquet test, and the complement-deviation test of Besredka, using Besredka's antigen. It was considered that the Wildbolz test had already been shown to be inaccurate. The results of these laboratory and clinical investigations demonstrate: 1. The absence of agreement between the tuberculin skin test and the reaction of Besredka; the findings giving support to the opinion that in older children the skin reaction indicates the previous existence of tuberculous infection, while the reaction of Besredka indicates the existence of tuberculous infection in process of evolution. 2. The impossibility of excluding tracheobronchial adenopathy of tuberculous origin on the ground of negative laboratory tests alone. 3. Conversely, a definitely positive Besredka fixation test is a strong argument in favor of the tuberculous nature of an adenopathy. Whether such reaction, when frankly positive, must be interpreted as indicating tuberculosis in process of active evolution, must be decided in the light of clinical findings.—*Le diagnostic de la nature tuberculeuse de l'adenopathie trachéo-bronchique de l'enfant, J. Belot, Arch. de. Méd. d. Enf., September, 1922, xxv, 537.*

X-Ray Diagnosis of Chronic Pulmonary Tuberculosis in Children.—Early in 1921 the writers presented a statistical study of 44 infants and children at the Boston Consumptive Hospital. Its purpose was to correlate roentgen ray findings with clinical tests and clinical manifestations of tuberculosis as they appeared in infancy and childhood. Among the conclusions appeared the following points: 1. In 26 of 36 children reacting positively to tuberculin, the roentgen ray disclosed the site of infection to be intrathoracic. 2. Three cases of positive sputum were found in 14 diagnoses of chronic pulmonary tuberculosis. 3. Fourteen cases of chronic pulmonary tuberculosis of the adult type were found. This suggests that "phthisis" is more common in childhood than has been stated in the text books. 4. Fifteen cases, clinically negative, showed definite roentgen ray signs of marked structural changes consistent with tuberculous infection. This raises the question whether these children are to be regarded as likely to develop clinical tuberculosis, and whether chronic pulmonary tuberculosis in children is more frequent than we are led to believe. If so, we can apply methods of treatment early enough to insure them a reasonably long and useful life. Thirty-four more cases among the children at the Boston Consumptive Hospital are added. While an absolute norm is not recognized at present, it is justifiable to assume certain lung markings consistent with tuberculosis if similar changes, and no others, occur in cases of well-proved tuberculous disease in children. However, the great necessity of correlating the clinical and roentgen ray findings must never be neglected. *Summary and conclusions:* A supplementary group of 34 infants and children, studied from the standpoint of correlating roentgen ray and clinical findings, is presented. These 34 cases are added to 44 cases previously reported. From this new group and total of 78 cases the following was found: 1. A complete total of 20 cases of definite chronic pulmonary tuberculosis in 78 children under fourteen years of age, or over 24 per cent. Ten, or 50 per cent, of these cases were in children under ten years of age. In spite of the apparent concentration of tuberculous cases at the Boston Consumptive's Hospital, it is believed that this large number of positive findings points to a more widespread incidence of pulmonary tuberculosis in children than has been sufficiently emphasized. The roentgen ray was of definite help in determining site, extent and type of lesion in each of the positive cases. 2. Eight patients were examined in whose lung fields the roentgenograph showed typical markings consistent with the changes caused by tubercle bacilli. These cases were negative clinically. Inasmuch as the prophylaxis of tuberculosis is more and more

being begun in childhood, the roentgen ray evidence of pulmonary involvement may safely be taken as a warning, and certain positive cases should receive more detailed attention and treatment along preventive lines. Ten cases from the old series were reëxamined by roentgen ray. These cases were clinically negative, but had shown positive lung field markings in previous roentgenographs. Five from these ten showed changes consistent with progression of the pulmonary condition; two showed development of cardiac lesions. From these it is concluded that serial roentgenographs should become a routine part of methods of procedure in the diagnosis and preventive treatment of tuberculosis in infants and children.—*Roentgen Ray and Tuberculosis in Infants and Children, F. W. O'Brien and F. B. Ames, Bost. M. & S. J., August 24, 1922, clxxxvii, 279.*

Roentgenographic Chest Shadows of Newly Born.—A series of 52 infants were radiographed, with one exception, within the first forty-eight hours after birth. The types of heart as determined by the shadows were as follows: globular, 21; adult type, 7; drop, 5; nutmeg, 3; square, 2; round, 1; unusual, 1; unclassified, 10. The study is summarized as follows: (1) heart shadows vary in shape, size and position; (2) these variations occur with no relation to the size of the infant; (3) the heart shadows may be grouped into several types according to shape; (4) the variations in constant relation between the heart shadow and the shadow of size and position occur in each of these types; (5) the shadow of the thymus is not necessarily influenced by the position of the heart; (6) the shadow of the thymus varies in its size and position independent of the heart shadow and with no relation to the size of the infant; (7) the variations in the shadows of the heart and of the thymus can exist without clinical manifestations of disease.—*A Study of the Shadows in the Thorax of the Newly Born, L. R. DeBuys and E. C. Samuels, Meeting, American Pediatric Society, May, 1922, reported in Arch. Pediatrics, June, 1922, xxxix, 410.*

Wildbolz Reaction in Infants.—Observations were made upon 12 newborn infants, 28 infants with some form of tuberculosis, 12 infants with other diseases and 13 older children with tuberculosis. The results of the Wildbolz auto-urine test were compared with those of various other tests in common use. The Wildbolz reaction was always positive in infants with active tuberculosis, always negative in those free from the disease. Moreover, the reaction was more strongly positive in those with more markedly active tuberculosis in any form. The pronounced sensitivity of the skin of newborn infants interfered with the reliability of the test in these cases. Repetition of the test on allergic individuals with negative response, will give further information on the activity of the process.—*La Ricerca degli Antigeni tubercolari nella Tubercolosi del lattante, A. de Capite, la Pediatria, September, 1922, xxx, 793.*

Wildbolz Reaction in Children.—Using the Bergen modification of Wildbolz's urine reaction, on a group of children between five and ten years of age, and comparing it with the Mantoux tuberculin test, the following results were obtained: Positive Mantoux and positive Wildbolz, 47 times; positive Mantoux and negative Wildbolz, 6 times; negative Mantoux and positive Wildbolz, 5 times; negative Mantoux and negative Wildbolz, 11 times. The parallelism in the first and last groups indicates that in general the Wildbolz reaction possesses a certain specific significance, but closer study of the entire series fails to reveal any particular value in recognizing the activity or inactivity of the tuberculous process. The modification of Katzulla, Lanz, and Čepulič, were not found to possess any advantages over the original Wildbolz technique.—*Über den Wert der Wildbolzschen Eigenharnreaktion beim tuberkulösen Kinde, J. C. Schippers and S. B. De V. Robles, Jahrb. f. Kinderhk., June, 1922, xcviii, 299.*

Tuberculin Skin Test in Whooping Cough.—From a study of 37 children the authors conclude that positive tuberculin skin reactions are rarer in children with whooping cough than in children apparently healthy or with various other complaints. They obtained positive tests in only 5.4 per cent of the pertussis cases, as compared with 35 to 55 per cent positive for other groups. In answer to the objection that these children did not have positive tests because they did not have tuberculosis, the authors present autopsy reports of 11 cases of pertussis with negative skin tests. Three cases, or 27 per cent, presented tuberculous lesions. In many of the cases with negative skin reactions, positive reactions had previously been obtained, the reactions becoming negative during the pertussis, even in children with unmistakable tracheobronchial lymphadenitis of tuberculous origin. Pertussis is thus seen to produce a state of anergy more marked when the pertussis is severe and complicated by bronchopneumonia. This state favors the production or hastens the progress of tuber-

culosis.—*La cuti-réaction à la tuberculine dans la coqueluche, l'anergie tuberculinique, P. Nobécourt and M. H. Forgeron, Arch. de Méd. d. Enf., July, 1922, xxv, 394.*

Treatment of Tuberculous Meningitis in Children with Bier's Hyperemia.—Bier's method of passive hyperemia was applied to three children, aged 4, 7, and 8, suffering from tuberculous meningitis. Eight similar cases were reported by Squarti in 1916. All the cases ended fatally. The author considers this form of treatment to be without benefit.—*Intorno alla Cura decompressiva e colla Stasi alla Bier nella Meningite tubercolare dei Bambini, O. Cozzolino, La Pediatria, May 15, 1922, xxx, 433.*

Vein Sign of Tracheobronchial Adenopathy in Children.—In small children the space between the anterior surface of the trachea and the superior vena cava is so small that enlargement of the tracheobronchial lymph nodes interferes with the venous circulation, with resulting congestion. The veins on the chest are occasionally found to be dilated, but the commonest site of superficial venous congestion is at the junction of the thoracic and superficial epigastric veins, resulting in a swollen bluish cord along the axillary line.—*Ün nuovo Segno della Adenopatia tracheo-bronchiale nei Bambini: la Dilatazione delle Vene toracico-epigastriche, O. Cozzolino, La Pediatria, August 1, 1922, xxx, 689.*

Tuberculous Pneumothorax in Young Infant.—Pneumothorax in the very young is rare. Debré and Laplane observed a case in a baby three and a half months old. The child was infected during the second and third months; the lungs were invaded from the beginning as was shown by a bilateral bronchopneumonia. A total pneumothorax occurred on the left side.—*Pneumothorax tuberculeux chez un nourrisson de trois mois et demi, Debré and Laplane, Section d'Études Scientifiques de l'Oeuvre de la Tuberculose, Paris, Jan. 14, 1922, reported in Rev. d. l. Tuberc., 1922, iii, no. 2, 175.*

Multiple Tuberculous Osteitis in Infancy.—Often a tuberculous involvement of the little long bones of the hand and foot will be considered to be due to hereditary syphilis, until the absence of confirmatory signs of syphilis and the presence of other evidence of tuberculosis cause the diagnosis of tuberculous osteitis to be made. In these cases the possibility of supervening tuberculous meningitis and of the formation of multiple osseous foci of tuberculosis must be borne in mind. Surgical tuberculosis is the result of a bacillemia, whether this be mild or severe, recognized or unrecognized. Of great importance are the number of bacilli inoculated at one time, the number of exposures to contamination, and the age of the child. The frequency of multiple lesions of the long bones, together with cutaneous tuberculides, is emphasized, the shotty tuberculous nodules being most frequently felt over the posterior aspect of the lower extremities. In early infancy, diaphyseal tuberculosis is more common. As the age increases, the epiphyses are far more likely to be involved. Tuberculous osteitis in infancy is characterized by frequent and rapid suppuration, with "red abscess" formation, incision being often powerless to prevent sinus formation. Regional lymph nodes are often involved, such involvement being not always tuberculous at first, but often being the site of true tuberculosis later. Sequestrum formation is common, and calls for surgical intervention. With regard to treatment, too stimulating or irritating a climate is to be avoided, as death from meningitis is perhaps more common, and as the improvement of the local lesions is questionable. Once cured, these may result in shortening or deformity.—*Osteites Tuberculeuses multiples du nourrisson, A. Broca, La Nourrisson, July, 1922, x, 209.*

Papulo-Necrotic Tuberculides with Terminal Miliary Tuberculosis.—The writer presents a thoroughly studied case of this condition, including postmortem findings, in a child of two years. Inoculation of a guinea pig with material from a tuberculide obtained during life, was successful. To insure a successful inoculation, a recent tuberculide must be selected, and the entire nodule inoculated. Papulonecrotic tuberculides in early infancy are much more frequent than hitherto suspected, often passing unrecognized. As a rule, at this age, they are the forerunners of miliary tuberculosis. The papulo-necrotic lesion requires for its production the local action of the tubercle bacillus. One must assume an allergic reaction ushered in by a bacillemia. To demonstrate the accuracy of the allergic theory of tuberculides, it is necessary to prove the existence of a tuberculous bacillemia by guinea pig inoculation, success in which will depend upon the frequency and intensity with which the bacilli gain access to the blood. Infants less than a year old apparently best fulfil these conditions. It is also essential to study the comparative inoculability of both beginning and receding papulo-necrotic lesions. In this regard, however, the patient's age is unimportant. The allergic cutaneous reaction is proof of partial

immunity of the skin to bacillary infection. In the adult this corresponds in intensity with the relative immunity of the rest of the body, the reaction disappearing with the progress of cachexia. In the young infant, on the contrary, such agreement does not exist. The allergic reaction appears and persists according as the general immunity does not exist, which indicates that the immunity of the skin is inversely proportional to that of the rest of the body. The nature of this special immunity is not known. Study of this subject may reveal the solution of the problem of resistance to tuberculosis.—*À propos d'une observation de tuberculides papulo-nécrotiques avec granulie terminale, G. Salès, Arch. de Méd. d. Enf., September, 1922, xxv, 513.*

Addison's Disease in Infant.—Addison's Disease is very rare in infancy, the author having found but two cases on record. His own patient, a boy of 16 months, had a positive tuberculin test, pigmentation, asthenia, low blood pressure, all the signs typical of the disease. The pigmentation progressed, but the asthenia became markedly diminished. The child had been free from symptoms until the age of 13 months.—*Malattia di Addison nella prima Infanzia, S. Cannata, La Pediatria, July 1, 1922, xxx, 585.*

Chronic Adrenal Insufficiency and Addison's Disease in Children.—The dystrophies of suprarenal origin are considered, first, accounting for the mode of injury to the gland and then the effect of the injury upon the body. The lesion in the gland may be due to hemorrhage or tumor or may follow in the course of some infectious disease as diphtheria, scarlet fever, or typhoid with chronic inflammation of the adrenal capsule; but the most common cause is tuberculosis which starts with a focus in the gland. The syndrome thus instituted is called Addison's disease, and in it there are two orders of symptoms: (1) those which arise from the adrenal insufficiency, such as asthenia, hypotension and cachexia; and (2) pigmentation and pain which follow sympathetic irritation. Although it is a rare disease, about 100 cases have been reported, most of the patients being between the ages of 12 and 15. The cardinal symptoms are (1) asthenia with progressive weakness; (2) gastrointestinal disturbances with foul tongue, anorexia, vomiting and diarrhea; (3) pain, not so well defined as in the adult type, sometimes simulating peritonitis; (4) pigmentation, usually a striking phenomenon and mainly on the exposed surfaces, including face, hands, articular folds, axillary region, groin, genitals, breasts and mucous membranes; at times blond hair becomes dark and dark lines appear in the nails; and (5) marked hypotension. The course of the disease is rapid, and death may come very suddenly. In nearly all the autopsies the capsules are studded with tubercles. Differential diagnosis must eliminate arsenical pigmentation and jaundice. These children often derive benefit from the administration of adrenal extract and other specific organotherapy. The theory of a mixture of the nerve and glandular elements is the best on which to base the symptoms. In the pretuberculous period, children who fatigue easily, remain thin and have low blood pressure are often helped by suprarenal therapy; also, those that remain in this condition after scarlet fever and diphtheria. They would appear to have some suprarenal insufficiency, as would certain other children with myopathies, myasthenias and the general debility that at times follow chorea. There are many other syndromes that follow suprarenal dystrophies, such as infantilism and nanism of senile type due usually to subnormal function. There is another class, not so clearly understood, due to hyperfunction, in which we see hypertension and, at times, glycosuria. As a result of tumors, gigantism sometimes develops, and in women the menses cease. Such women grow large and strong, a beard appears and the voice becomes masculine; frequently a homosexuality develops. Following tumors in other locations, clinical pictures not unlike Addison's disease may appear. Peyron has shown that the interstitial cells of the ovary and testicle have the same structure and origin as the cells of the suprarenal cortex. Experimentally, when the ovary is removed, the adrenals hypertrophy. In short, there are chronic lesions of the suprarenal gland, producing a symptomatology not unlike Addison's disease, but on the other hand by a complex mechanism they may act upon the body to produce either nanism or gigantism with precocious puberty.—*L'insuffisance surrénale chronique et la maladie d'Addison chez l'enfant, Lereboullet, Le Prog. Méd., May 6, 1922, no. 18, p. 201.*

Unusual Mediastinal Tumor in Child.—The patient, a boy, aged seven, had "bronchitis" in 1919 and he was admitted to the hospital, February 2, 1922, with a history of having had a sudden attack of severe dyspnea the night before. Examination showed pallor, malnutrition, rapid and labored respiration, with frequent cough, fulness of the left upper chest where there was also a plexus of enlarged and congested superficial veins, no visible cardiac

impulse and a pea-sized node in each axilla. The percussion note was dull from a point just outside the left nipple line almost to the right nipple line, and from the clavicles to the diaphragm. Breath sounds were diminished. X-ray examination showed a pronounced density in the region noted, filling more than half the thorax; its borders were scalloped. Blood examination revealed a slight anemia with 11,680 leucocytes per cubic millimetre. Section of an axillary node showed nothing characteristic. Following further severe attacks of dyspnea, intensive X-ray treatment was given. This prevented further evidence of asphyxia and the mass decreased in size. The fulness of the left chest together with the distended veins disappeared, the general health improved and on April 21, the roentgen findings were practically normal. The tumor was believed to be that of Hodgkin's disease or lymphosarcoma, because of its size and probably rapid development in a child previously healthy, and because of the variation in the density of the shadow. A large hyperplastic or a sarcomatous thymus gland could not be definitely excluded.—*An Unusual Case of Mediastinal Tumor, T. B. Cooley, Meeting, American Pediatric Society, May, 1922, reported in Arch. Pediatrics, June, 1922, xxxix, 398.*

Prognosis of Tuberculosis in Infancy.—Until rather recently, pulmonary tuberculosis occurring during the first year of life, has been regarded as being almost invariably fatal, and this usually within a period of six months from the time of infection. During the past ten or twelve years, however, more and more evidence has accumulated which appears to prove that many such infected children ultimately overcome their infection and live out their normal span of years. Undoubtedly, the Pirquet reaction has been an important factor in causing this change of view, for by its routine use it has been possible to recognize the infection and start treatment relatively early. The present contribution is from the University Hospital and Clinic at Leipzig, the study covering a period of eight years and embracing 135 infants under one year of age. The diagnosis was based on the finding of a repeatedly positive Pirquet or intracutaneous tuberculin test, bacilli in the sputum, spinal fluid or feces, or on autopsy evidence, but not all cases presented abnormalities on physical examination. Of the 135 tuberculous infants, it was possible to ascertain the ultimate fate in 113; and of these 74 (65.48 per cent) died of tuberculosis, 3 died of some intercurrent infection, and 36 were still living one-half to eight years after the first examination. Sixty-four (86.5 per cent) of the children died during the first year of life, 8 (10.8 per cent) in the second, and 2 (2.7 per cent) in the third year, so that it seems reasonable to suppose that children who survive the third year of life stand an excellent chance of permanently overcoming their infection. However, even in those children who escaped a fatal outcome, subsequent examination several years later showed in several instances a persistence of some active tuberculous infection, and there is always the possibility of this terminating unfavorably. In 19 infants there was no evidence of infection except the positive tuberculin test; nevertheless, 8 of these succumbed. Of 71 children with the chief localization of the infection in the lungs and bronchial nodes, 42 (59.15 per cent) died of tuberculosis and 3 from some intercurrent infection; of 5 with abdominal tuberculosis, and 26 with miliary tuberculosis or meningitis, all died; and of 11 with skin, bone and lymph node infections, only one died. The material for this study was drawn almost entirely from the poorer classes in a large city, where conditions for conquering the disease were distinctly unfavorable.—*Zur Prognose der Säuglingstuberkulose., R. Osswald, Monatschr. f. Kinderhk. May, 1922, xxiii, 168.*

Prophylaxis of Tuberculosis in Nursing Children.—Dr. Darre spoke first upon tuberculosis in nurslings, its frequency, its etiology and its prophylaxis. Concerning the latter, he discussed in detail all the minutae of family placement and of collective care. As to the former, he regards it as excessively faulty, but with the advantage that it is immediately available, as collective care is not. The drawbacks of family placement depend at present in great part on the unfitness of the peasant guardians, but in the future, when the number of babies to be placed will be greatly multiplied, not only will it become more difficult to find suitable families in which to place children, but the number of nurses who, in the absence of supervision, may be trusted to honestly and efficiently carry out the needful routine will be altogether inadequate. He regards the method of collective placement, with the babies isolated in cubicles, as an ideal for the future. At present it is inadmissible on account of its cost, and meanwhile the method of family placement should be extended as fast as possible. As soon as may be the two methods should be superimposed, collective placement being employed for the first months, after which the children are placed in families.—*Prophylaxie de la tuberculose et de la syphilis du nourisson, Darre, Cong. Ann. d' Hyg., Paris, Nov. 3-8, 1921, reported in Rev. d. l. Tuberc., 1922, iii, no. 1, 53.*

Preventoria and Fresh Air Schools in France.—Dr. Genevrier discussed the great need of day schools for tuberculous children and spoke briefly of the eight new schools of this sort established in Paris, either in open places of the city or upon the fortifications. He regards the results as encouraging and the need of more schools as obvious. He gave a more extended description of the working of the out patient preventorium for tuberculosis which has been established in connection with Saint Joseph's Hospital. The preventorium is open from eight in the morning to six in the evening to children of the quarter with ganglio-pulmonary consumption who belong to nontuberculous families. These patients are kept in fresh air and sunlight, with the greatest possible exposure of skin which is thereby greatly hardened. Improvement in general and local symptoms is rapid and after a stay of three to four months almost all the children can return to their ordinary life. Their condition is subsequently supervised at the dispensary and, if necessary, they are readmitted to the preventorium. Unfortunately, the complete return of the children to their families is very frequently followed by a recrudescence of the previous symptoms. This fact brings up the problem of a permanent settling in the country of all children with tuberculosis.—*Preventoria et écoles de plein air dans les espaces libre des grandes villes, Genevrier, Cong. Annuel d' Hyg., Paris, 1921, Nov. 3–8, reported in Rev. d. l. Tuberc., 1922, iii, no. 1, 43.*

Technique of Tuberculin Testing of Cattle.—The veterinarian is an important factor in tuberculosis control work and he must be familiar with all phases of the disease. Cattle should be stabled several hours before the tuberculin test is made. By tact and courtesy the owner should be made to understand the importance of the work. The history of the herd should be obtained, concerning origin, previous tuberculin tests and recent selling, slaughtering or deaths, and a complete physical inspection should also be done. The owner should be instructed on the following points, as to care of the herd during the test: 1. Reduce feeding. 2. Never water immediately before taking a temperature. 3. Provide good ventilation. 4. Milk as usual. 5. Stables should be clean and no animals removed without veterinarian's permission. In testing, animals with high or irregular temperature should not be injected. In the subcutaneous test, the dose of United States Bureau of Animal Industry tuberculin is 2 to 6 cc., depending upon age and weight of cattle. It is injected into the side of the neck or the soft skin back of the elbow. Local disinfection of the skin is recommended and it is of greatest importance to use sterile needles. Post-injection temperatures should be taken eight hours after injection, and should be continued at two-hour intervals for eighteen hours. A reaction is a gradual rise in temperature for a period of at least two readings and a slow recession. Other symptoms such as chills, depression, diarrhea, roughening of coat and anorexia, may be in evidence. The results should be recorded: *N*, indicating negative; *S*, indicating suspicious; *P*, indicating a positive reaction. There are many influences which have to be guarded against, since they may affect the reliability of the test. Driving animals in hot weather, direct sunlight, badly ventilated barns, sudden chilling, too much or too little water, using bulls for service during the test, excessive bagging of cows, repeated or recent tuberculin tests, acute indigestion, any infection, changes in feeding and attendants will influence results; ranging animals will often show irregular temperatures when stabled; some animals normally have an elevation of temperature at milking or feeding time; chronic "bullers" often show irregular temperatures; recent or repeated injection of tuberculin may produce tolerance. In making the intracutaneous test, the dose of tuberculin is 2 to 5 drops. The point of injection in a normal subcaudal fold is the most dependent part, but when this fold is loose and flabby the injection should be made where the fold joins the under surface of the tail. Cleanliness is a most important factor. The readings should be made seventy-two and ninety-six hours, respectively, after the test. In recording the results, the code adopted by the United States Live Stock Sanitary Association is used: *N*, indicating no reaction; *P-1*, indicating pea sized swelling; and *P-2*, *P-3*, etc., indicating proportionately large swellings. *Thick, 2-x* indicates a diffuse swelling twice as thick as a normal fold, *Thick, 3-x*, *Thick, 4-x*, etc., in accordance with the findings. Thermic reactions often occur between the eighth and twentieth hours of the injection. Though not official, the ophthalmic test may be used at any time and in any combination. Liquid or disc tuberculin may be used. In using the former a glass dropper is used and an attendant holds the animal's head, so that the 2 or 3 drops of 4 per cent solution will spread equally over the eyes. The disc should be placed well back on the eye ball, under the upper lid, and toward the outer canthus. The first treatment serves to sensitize the eye. Three or four days later, 2 or 3 drops of 8 per cent solution or 2 discs are applied. Observation should be made after three or four hours and every two hours

for twelve or fourteen hours. In recording results *N* indicates no reaction; *P-1* indicates small amount of pus; and *P-2*, abundant pus, combined with hyperemia of conjunctiva and swelling of lid. One should not be confused by a slight white mucous discharge that occurs soon after the instillation. A combination of either two or three tests may be used. The best results are obtained by simultaneous injections, intracutaneous and subcutaneous, and a sensitizing dose in the eye. The results of the subcutaneous injection are recorded at the end of the test. A second ophthamic instillation is made in seventy-two hours, simultaneous with the first intracutaneous reading. The tests are then followed as described separately above. At ninety-six hours the test is completed.—*Technique of Tuberculin Test, H. W. Turner, J. Am. Vet. Med. Ass., September, 1922, lxi, new series, xiv, 636.*

Primary Tuberculosis of Middle Ear.—A ten months' old baby had tuberculosis of the middle ear with polyps of the drum, showing typical lesions of tuberculosis in active evolution. The child afterward had a cervical adenitis of the same side; its lungs were not affected; its general health and development were normal.—*Un cas de tuberculose primitive de l'oreille moyenne, Hubert, Meeting, Société de Laryngologie, d'Otologie et de Rhinologie, May 15, 1922, reported in Presse Méd., May 31, 1922, xxx, 471.*

Tuberculosis of Breast.—The incidence of this disease lies between 0.51 per cent and 1.7 per cent. The age at onset usually is between twenty and forty-five years. Infection may come through blood, lymph, direct extension or impaired nipple. The general appearance of the nodular or discrete type is that of a small lump in the breast. When seen early the gland is moveable; the skin over it soon presents a pig-skin-like appearance and later redness and fluctuation may appear with consequent immobility of the lesion. Retraction of the nipple may occur early or late. Enlarged lymph nodes in the axilla are equally present or absent in the early stages. Growth is slow and painless; if the lesion breaks down, pain, soreness and fluctuation may appear. At this time the axillary nodes are usually involved. Usually, the lesion cannot be differentiated from carcinoma; sarcomata are more rapidly growing than the nodular type. Actinomycosis, gumma, echinococcus cyst and sporotrichosis are remote possibilities and can practically be ruled out by a careful history. The general appearance of the confluent type is more easily recognized. The breast is very large, completely involved and not symmetrical. The growth is more rapid and there is more tenderness. There is usually a history of preëxisting tuberculosis. The treatment of the nodular or discrete type is to remove the nodules if limited to one focus; if more than one, it is safer to remove the breast. In the confluent type an amputation of the breast and dissection of the axilla is the best treatment. If there is an incurable primary condition, operation is contraindicated. Roentgen rays may serve a good therapeutic purpose. *Summary:* 1. One of the rarest forms of tuberculosis. 2. Source of infection variable. 3. Diagnosis often difficult between carcinoma and tuberculosis. 4. Operation gives excellent results, the type of operation depending upon type of infection.—*Tuberculosis of the Breast, with Report of Two Cases, P. H. Leavitt, Bost. M. & S. J., September 14, 1922, clxxxvii, 392.*

Pleural Effusions.—The lecture attempts first to explain and discuss the common physical signs, of pleural effusion, and then refers to its treatment. *Principal Signs of Effusion:* 1. *Displacement of apex beat of heart.* This is best observed in cases of left-sided effusion, because in its normal position the heart lies obliquely. Its basal portion being fixed by the great vessels, it is chiefly the apical portion which is displaced. From its anatomical position, the amplitude of its pendulum movement must be greater toward the right. In moderate effusion the apex may be said to be dragged over by lateral traction of the sound lung, whereas in large effusions it is pushed over by pressure of the fluid. 2. *Dulness on percussion.* This may be felt as well as heard. It was a convex upper extremity called *Damoiseau's curve*, with its highest point laterally, and does not alter in shape with altered position of the patient, unless a pneumothorax exists. 3. *Annulled vocal fremitus.* Experiments in collaboration with Prof. A. V. Hill indicate that the vibrations of vocal fremitus originate in the vocal cords and are transmitted to the chest wall. There are apparently two factors in their annulment; first, the difficulty in passage of sound from air to water, which because of its greater density tends to reflect instead of absorb the waves, and second, the inability of water to transmit all vibrations received, simply damping down many of them. As long as there is a rigid connection between lungs and chest wall vocal fremitus may be retained, for instance, solid adhesions are capable of conducting vibrations. 4. *Absent breath sounds.* The explanation is somewhat similar to the foregoing; also, vesicular breathing is hindered by compression of the lung alveoli. In some cases of pleural effusions bronchial breathing is heard,

usually faint or distant; it is not at all uncommon in children. 5. *Subsidiary Signs.* Most of these, such as Grocco's sign, egophony, Skodaic resonance, etc., are inconstant. The shape of the chest is not usually altered, for the lung collapses as fluid is poured out. *Nature of the Fluid:* In empyema it is the rule to have greater remissions in temperature, nightsweats and other septic phenomena. A point mentioned by Hale White is of value, namely, local tenderness of the chest wall as indication of pus. However, there are no physical signs pathognomonic of pus, and the exploratory needle should therefore be employed when there is any doubt. It must be remembered that the signs and symptoms of empyema may be simulated by perinephritic abscess and pyonephrosis, when the diaphragm is pushed up and the base of the lung compressed. *Treatment:* In the majority of cases of serous effusion, absorption begins within two or three weeks and continues until the fluid has entirely disappeared. In the early stage, unless there are indications to the contrary, it is inadvisable to withdraw the fluid, because its presence keeps the two pleural layers apart and thus rests the inflamed surfaces. As expressed by Horder, removal of the fluid before the high tide in the evolution of the process of exudation, which is not usually reached before the tenth day, is likely to lead to recurrence. There are, however, certain indications for removal of the fluid, namely: 1. When stationary, that is, when there are no signs of absorption after two or three weeks; otherwise, the lung may remain partially collapsed and breathing be permanently impaired. 2. Signs of positive intrathoracic pressure, the chief of which are extension of dulness above the third rib, with disappearance of Skodaic resonance, bulging of the chest wall, and crepitations over the base of the opposite lung due to edema. These signs may be accompanied by marked dyspena on slight exertion, cyanosis and palpitation and irregular pulse. When it is necessary to remove fluid, it should be withdrawn slowly, under but slight negative pressure, in order to avoid too sudden expansion of the lung. It is rarely necessary to remove it all, and the needle should be withdrawn if the patient complains of great pain in the side, begins to cough violently, or faints or shows obvious distress. Removal of a part of the fluid hastens absorption of the remainder.—*A Post-Graduate Lecture on Pleural Effusion, A. Ramsbottom, Lancet, September 16, 1922, cciii, 595.*

Hepatic Anergy in Tuberculosis.—The liver plays an important rôle in the metabolism of minerals and lipoids. At the same time, it has its emunctory function, but these are all secondary to its extremely important part in nutrition, still the bulwark in tuberculosis therapy. There is a state of lowered resistance on the part of the liver in tuberculosis and this is termed hepatic anergy. The proofs of it are clinical, biological and experimental. From the clinical standpoint, attention is called to certain cirrhoses which, at the period of severe hepatic insufficiency, assume a rapidly progressive form and have associated with them a miliary tuberculosis. The latter is of the peritoneum alone in certain cases, but may also be of the lungs, kidneys, spleen and meninges. The liver lesions are not always of the same type, although the hypertrophic, fatty cirrhosis predominates; the atrophic variety is exceptional. Biological proof is found in the results of skin reactions which, in cases of liver insufficiency in adults, were found negative in 54 to 58 per cent of cases and frankly positive in only some 16 per cent. It is the gravity of the liver cirrhosis rather than the particular form which renders the skin reaction negative. Furthermore, in 30 cases of acute jaundice, most of them of the catarrhal type, the skin reaction was negative in 78 per cent. The third proof is experimental. Three guinea pigs were injected with 1 to 2 cc. of phosphorated oil every four to eight days, until it was determined that a slow degeneration of the liver parenchyma was in progress. The three animals, along with two controls, were then injected with dilutions of bacillus-containing sputum. Whereas allergy developed in six days in the controls, it was not present until the twenty-sixth to the thirty-seventh day in the animals with degenerated livers. This prolongation of the antiallergic interval is like that found in pregnant animals, which is regarded as indicating a state of anergy on their part. The practical conclusion is that the liver is to be shielded by avoiding senseless overfeeding, and medicaments toxic to the liver, such as creosote, guiacol, arsenic, phosphorus and alcohol. An hepatic organotherapy might be tried as an experiment.—*L'anergie hépatique dans la tuberculose, N. Fiessinger and P. Brodin, Ann. de Méd., June, 1922, xi, 454.*

Histological Development of Tuberculous Enteritis.—Experiment has shown that even in a slight tuberculous infection the blood carries bacteria, and Calmette believes that every infection begins as a bacillemia which exists before any local lesions. Histological study of autopsy material made it possible to follow the evolution of tuberculous enteritis as precisely as this

could have been done by the experimental method. In the first stage bacilli are found present in the interior of the intestinal wall previous to any clinical manifestation and even previous to the most minute alteration in the linings. At this stage the bacilli are situated in the muscle layers distant from the intestinal canal and from the mucous membrane and its glands. In the next stage the bacteria multiply in the lymphoid tissue, which then either undergoes coagulation necrosis or becomes organized to form typical tuberculosis. Finally, the morbid changes lead to a characteristic ulceration. The initial process in these events is a histological bacillosis. The path of entry is the blood system, especially the arteries. The embolism is the focus of infection. The sections show arterioles having empty lumina, and walls infiltrated with tubercle bacilli. The germs predominate in the external parts of the intestine and are absent or extremely rare in the mucous membrane. They were never found in the region of the glands even in the vicinity of ulcerations. This eccentric distribution of bacilli explains the frequent presence of subperitoneal tubercles which at times roughen the serosa, lying beneath it at the outer surface of the intestine. The successive stages of a tuberculous enteritis may then be described as emboli; arterioles and capillaries are occluded with bacilli which migrate by diapedesis into the surrounding tissues; next, the intestinal stage proper, with formation of closed microscopic follicles; multiplication of bacilli in their interior, and coagulation or caseous necrosis, due to toxins. A last stage, exclusively lymphatic, is manifested microscopically in cases of intestinal ulceration by a characteristic lymphangitis which travels under the peritoneum, penetrates the mesentery and attacks its lymph nodes which form the path by which tuberculosis invades the liver (Sergent). The pathogenesis of ulceration permits of two different interpretations: Secondary invasions of ordinary bacteria, favored by neighboring emboli, may bring about necrosis and ulceration of the affected parts; or the continuous bringing of bacilli may provoke an allergic reaction resulting in a swift massive elimination of bacilli accompanied by the necrosis of an entire section of mucous membrane and a consequent ulceration. Besides necrotic and caseous areas there occur also sclerotic processes, in which the region affected becomes transformed into a fibrous web and the closed, hypertrophied follicles are empty of lymphoid cells.—*Le rôle de la bacillose histologique dans l'entérite tuberculeuse, E. Lenoble, Rev. d. l. Tuberc., 1922, iii, no. 2, 117.*

Acute Tuberculous Ileus.—Panchet reported a recent observation on a patient who displayed all the causes of obliteration, at one time; stenosis of the ileum, ileocecal stenosis, about a metre of adhesions in the region of the ileum. He operated, doing an ileosigmoidostomy, resection of the stricture and liberation with the bistoury of the whole adherent loop.—*Occlusion aigue par tuberculose intestinale, Panchet, Meeting, Société des Chirurgiens de Paris, May 19, 1922, reported in Presse Méd., May 13, 1922, xxx, 470.*

Treatment of Addison's Disease.—Under the heading, "An Autograph History of a Case of Addison's Disease," the late Dr. A. L. Muirhead gave a description of the course of his own illness up to December, 1920 (*J. Am. M. Ass., lxxvi, 652*). The present report covers the subsequent course of the disease. Clinically, Dr. Muirhead presented a typical, slowly progressing case of chronic Addison's disease with pigmentation, marked asthenia, intestinal discomfort and low blood pressure. At the Mayo Clinic he was put on suprarenal treatment; epinephrin solution, 1:1000, 3 minims, twice a day hypodermically; rectal injections of three-two-hundredths grain of the whole gland, and two capsules, 10 grains each of whole gland, by mouth, at night. The patient's improvement under this treatment was striking objectively as well as subjectively. Rectal injections of epinephrin proved effecive for a considerable period, although they were finally discontinued because of tenesmus. Glandular therapy was of unquestionable value in the relief of asthenia and of gastrointestinal discomfort, and resulted in a temporary clearing up of pigmentation. For a time at least, it also checked the general course of the disease. Although the results were only temporary, they were almost miraculous. Such definite relief of symptoms in the chronic form of the disease justifies a thorough trial of such measures in other cases of Addison's disease.—*Subsequent Course of a Case of Addison's Disease, L. G. Rowntree, J. Am. M. Ass., August 12, 1922, lxxix, 556.*

Pott's Disease with Spina Bifida.—A girl of 16 had been treated for three years for a presumptive lower dorsal spinal tuberculosis of a scoliotic form. There was a spina bifida and the vertebrae were incompletely ankylosed.—*Mal du Pott à forme scoliolique, Mouchet and Roederer, Meeting, Société de Pédiatrie, April 25, 1922, reported in Presse Méd. May 6, 1922, p. 393.*

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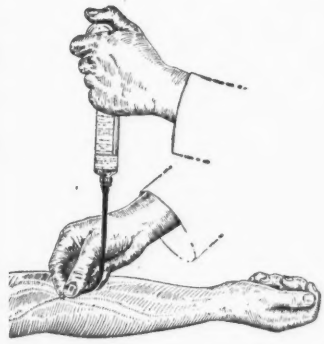

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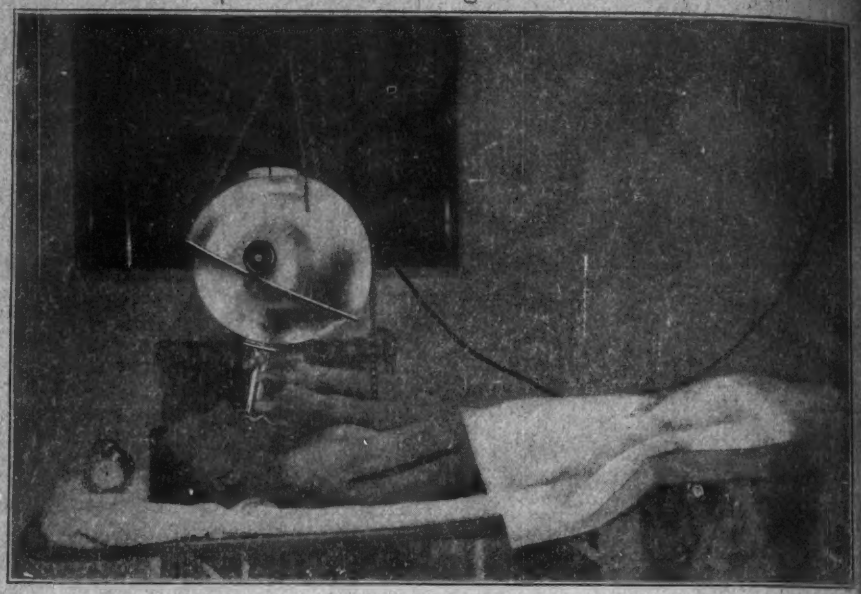

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